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REPORTS

OF THE

DEPARTMENT OF COMMERCE

1913

REPORT OF THE SECRETARY OF COMMERCE

AND

REPORTS OF BUREAUS

WASHINGTON
GOVERNMENT PRINTING OFFICE
1914

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REPORT

OF THE

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7

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ANNUAL REPORT

OF THE

SECRETARY OF COMMERCE.

DEPARTMENT OF COMMERCE,
OFFICE OF THE SECRETARY,
Washington, December 16, 1913.

To the PRESIDENT:

I have the honor to submit my first annual report, being the eleventh annual report of so much of the former Department of Commerce and Labor as is now included within the Department of Commerce.

Under the headings in the following pages of the divisions constituting what is technically called the Office of the Secretary and of the bureaus which with them constitute the Department will be found outlined the work of the Department in its various subdivisions.

Under the Disbursing Office will be found a statement of the cost of the Department's operations during the last fiscal year, together with the details of the division of the appropriations for that year between the newly formed Department of Commerce and Department of Labor.

PRESENT ORGANIZATION OF THE DEPARTMENT.

Referring, therefore, to subsequent pages for the details of the service of the Department during the past fiscal year, let me state briefly here what the present organization of the Department is, and, after a few words explanatory of this, proceed to certain outlines of present and future policy looking toward the development of the work of the Department into spheres of enlarged social and public usefulness.

The Department consists of nine bureaus and the Office of the Secretary, the latter being divided into five divisions—Office of the Chief Clerk (including the Division of Supplies), Disbursing Office, Appointment Division, Division of Publications, and Office of the Solicitor. The nine bureaus are respectively those of Foreign and Domestic Commerce, Corporations, Standards, Census, Fisheries, Lighthouses, Coast and Geodetic Survey, Steamboat-Inspection Service, and Navigation.

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HOUSING ACCOMMODATIONS.

The Office of the Secretary and five bureaus have been concentrated since October 1 in the Commerce Building, Pennsylvania Avenue and Nineteenth Street NW. The Bureau of Standards, Bureau of the Census, Bureau of Fisheries, and the Coast and Geodetic Survey are in separate buildings in various parts of Washington, all of which, save that occupied by the Census, are owned by the Government. It is hoped to unite during the current year the Bureau of the Census with the rest of the Department by an addition to the Commerce Building. This would save annually a large sum, because the rented building which the Census Bureau now occupies is very costly to maintain. It is also intolerably hot in the summer season, insanitary, and of such construction as to expose to constant risk from fire the invaluable papers stored therein.

The rental paid by the Department for the two privately owned buildings which it occupies, together with that paid for a small stable, amounts to $70,800 per annum, equal to the interest on $2,360,000 at 3 per cent. There is a constant element of money loss as well as a loss of efficiency in the separation of the Census Bureau, the Bureau of Fisheries, and the Coast and Geodetic Survey from the rest of the Department. The work of the Bureau of Standards is of such a character as to require that it be placed at a distance from the built-up portions of the city. No such condition affects these other bureaus, two of which are near the Capitol, one on the Mall, and all so placed as to produce the maximum of expense in operation and maintenance with the minimum of efficiency in results. Furthermore, the buildings in which the Coast and Geodetic Survey and the Bureau of Fisheries are located are as ill adapted for their purposes as is that occupied by the Census. Indeed, it would be hard to find two buildings worse suited for the uses to which they are put than are those in which these two important services are housed. Much important work of the Coast and Geodetic Survey is conducted in what was an old stable, and the invaluable plates and records of the Survey are in constant danger of destruction by fire. Two small fires have already occurred and would have resulted in the destruction of the building if the blazes had not been early discovered through a fortunate accident. The building occupied by the Bureau of Fisheries was built as an armory for the militia of the District of Columbia in 1856. In 1878 it was used as a storehouse. In 1882 it was partly used for a fish hatchery. It has long been antiquated and out of date. No private concern that had an eye to economical management would permit the use of these buildings for their respective purposes longer than necessary for obtaining the funds to replace them.

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PROPOSED NEW BUILDING.

I strongly recommend that the proposed new Government building for the Department of Commerce be so planned that it shall contain the Bureau of the Census, the Coast and Geodetic Survey, and the administrative portion of the Bureau of Fisheries.

The Bureau of Standards must necessarily remain in its own special laboratories built for its use.

The Bureau of Fisheries should be provided with a modern aquarium, suited alike for the education of the public and the carrying on of the scientific work of the Bureau. This should be housed in a separate building, located as near as practicable to the proposed new building for the Department.

Land has already been purchased by the Government for a building of its own for the Department of Commerce and it would in my judgment be easy to revise the plans for the space intended at the time the plans were made for the bureaus since diverted into the Department of Labor so that it may receive, as above stated, the Census, the Fisheries, and the Coast and Geodetic Survey. In this connection I venture on behalf of the Department and as a business man to protest against the policy of paying rent to private parties for buildings intended for the public service, especially when this requires the work of a great department to be split up into numerous separate parts at a greatly enhanced cost for maintenance and operation.

The Department of Commerce occupies the Commerce Building under a five-year lease, but it would take substantially that time to complete the new structure and it would in my judgment be wise fiscal policy to proceed as promptly as possible with the latter. The site now occupied by the Coast and Geodetic Survey, of which a portion is occupied also by the United States Public Health Service, is a valuable corner immediately adjoining the Capitol, admirably suited for a building to be used in connection with the legislative branch but quite unfit for the home of a part of an executive department most of which is placed at the far end of the city.

EXPENDITURES, PERSONNEL, AND EQUIPMENT.

The cost of maintaining the Department of Commerce for the fiscal year ended June 30, 1913, reckoning only those bureaus of the former Department of Commerce and Labor which are now the Department of Commerce, was $11,275,977.24. On June 30, 1913, there were turned in to the surplus fund in the Treasury unused balances of the appropriations for the Department of Commerce and Labor amounting to $618,970.01. The total force employed at the close of the fiscal year (excluding all employees for bureaus now in

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the Department of Labor), of which details appear under the Appointment Division, was 17,674 persons. The work of the Department requires the use of the following vessels: Coast and Geodetic Survey, 11; Bureau of Navigation, 1; Bureau of Lighthouses (exclusive of light vessels), 44, and Bureau of Fisheries, 8, a total of 64. This is exclusive of four vessels loaned to the Coast and Geodetic Survey by the Philippine Government. Its services cover the lighting and surveying of the Atlantic, Pacific, and Gulf coasts of the continental United States, the shores of Alaska, Porto Rico, and Hawaii, the lighting of the Great Lakes with their connecting rivers, and the survey of the shores of the Philippine Islands.

The Bureau of Fisheries maintains 34 main and 92 auxiliary fish hatcheries and culture stations, and exercises supervision over the salmon fisheries of Alaska and over the seal herd on the Pribilof Islands, in the Bering Sea.

The Bureau of Standards has laboratories in Washington and Pittsburgh.

The Coast and Geodetic Survey maintains magnetic observatories at Cheltenham, Md.; Tucson, Ariz.; Vieques, P. R.; Sitka, Alaska, and Honolulu, Hawaii, and takes tidal observations at regular stations in Maine, New York, New Jersey, Pennsylvania, Maryland, Florida, Texas, California, Washington, and Alaska.

The Bureau of Foreign and Domestic Commerce has opened, or is preparing to open, offices in New York, Chicago, New Orleans, and San Francisco.

The above survey is both brief and partial, but it gives an idea of the extent of the work of the Department. It may be added that the commercial agents under the Bureau of Foreign and Domestic Commerce travel abroad through all lands, and that the same Bureau receives and publishes the commercial reports of our consuls in all countries, while the agents of the Census Bureau cover all parts of the United States.

OUTLINE OF PRESENT AND FUTURE POLICY.

NECESSITY FOR INCREASED APPROPRIATIONS.

The appropriations for the current fiscal year (ending June 30, 1914) provide for the use of the Department the sum of $11,485,027.07. The estimates for 1915, including $484,000 for printing and binding but excluding $785,000 not directly estimated for public works for the Lighthouse Service, total $15,800,270, an increase of $4,315,242.93 over the appropriations for 1914.

The largest single item in the increased funds requested is the necessary provision for the quinquennial census of manufactures which is by law required to be taken for the year 1914. The sum required for this work is $566,400. Another considerable item is

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the request on the behalf of the Coast and Geodetic Survey for three new vessels for Alaska and three small vessels for wire-drag work and resurveys on the Atlantic coast. Attention has been sharply concentrated upon the dangers of the Alaskan coast by the disasters to the Lighthouse vessel *Armeria* and to the *Curacao* and the *State of California.* The last vessel struck an uncharted pinnacle rock in Gambier Bay on August 17, 1913, and sank immediately with the loss of 31 lives. Following these and other accidents the maritime interests of the Northwest have earnestly urged that the coast of Alaska be not only protected by lights and buoys but that the dangers of those shores be carefully surveyed and charted by modern methods. It is obvious that this must be done before Alaska can reach her true prosperity, for we can never approach that territory direct from our own shores except by water, and her maritime commerce must always be a large portion of her total trade. Furthermore, the enlightened humanity of this great nation forbids our accepting such great risks as that involved in the loss of passenger steamers longer than is necessary to bring the funds and the forces of the nation to bear upon them. Three new vessels are therefore needed by the Coast Survey on the shores of Alaska, one of which must replace an old ship not fit for service in exposed localities. The method of surveying known as the "wire drag," had it been used in Gambier Bay, Alaska, a year or more ago, would have saved the loss of the vessel and lives in the case of the steamship *State of California.* Only one such organization is now possible with the funds available. That is at work on the Atlantic coast. Three small vessels are needed to continue this work and it is of urgent importance for human safety that a "wire-drag" party be provided for Alaska.

In like manner and for the same reason it is requisite that the shores of Alaska shall be lighted as promptly as possible and that the necessary aids to navigation on that dangerous coast shall be rapidly multiplied till all dangers are marked. Delay either in the survey or in the protection by lights and buoys of these shores is so risky and unwise a course that this Department can not be responsible for it. Such sums, therefore, as can be wisely spent during the coming fiscal year in these important works form a portion of the increase in the estimates above cited.

There remain five fundamental matters of policy for which funds are asked and to which I specially desire to call your attention and that of the country.

REORGANIZATION OF BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

Under the caption "Bureau of Foreign and Domestic Commerce" will be found a plan for the reorganization of that bureau which

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has already met with your approval and which forms a portion of the estimates for the coming year. Our foreign commerce has grown by leaps and bounds until during the fiscal year ended June 30, 1913, it reached the great total of $4,279,000,000 in value. Of this great sum $2,466,000,000 were exports and $1,813,000,000 were imports, showing a trade balance on these transactions in our favor of $653,000,000. Quite as important as the aggregate, however, are some of the details that go to make up the totals. Our exports of domestic manufactured goods of all kinds amounted to $1,507,000,000, or 63 per cent of our total domestic exports. Again, it will be noted with special interest that out of this total of sales of manufactures that particular portion which represents the sales of fully finished manufactures was $778,000,000 in value, or 50 per cent of the total exports of manufactures. To state it differently, our exports of crude foodstuffs and of crude materials of other kinds have fallen to a minor place, and the largest element in the greatest aggregate of foreign sales ever made is that of manufactured goods, and among these manufactured goods the item of fully finished manufactures is the largest. It is also that which has been growing most rapidly.

It certainly can not be said that the Government has done much to foster this great and growing trade. The entire appropriation for the promotion of our foreign commerce has been $60,000, much less than is annually spent for advertising by many a large retail establishment, nor has the Bureau of Foreign and Domestic Commerce, which is supposed to have had this great trade under its fostering care, been equipped either with men or means or organization adequate for the work.

In the estimates for the coming fiscal year, therefore, a sum has been included which will provide for the reorganization of the Bureau into such form as will make it the basis for productive effort in developing American industries in every field which is normal to them at home and abroad. It is not suggested that in the plans which have been submitted for the approval of Congress there is aught that is original. They simply follow in general the organization which our commercial and industrial competitors have already in active service. They aim to provide a threefold organization abroad containing those elements of permanence and flexibility essential to efficient work, and furnishing the general and the local inquiry essential to any thorough grasp of foreign markets.

Briefly stated, the proposed organization provides for—

Commercial attachés.—These are officers to be located at each of fourteen capitals as hereinafter described, accredited to our embassies there by the Department of State but reporting directly to the Department of Commerce. Each of these officers will be provided with a clerk and allowance will be made for traveling expenses

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within the limits of the country to which he is sent. Their purpose will be to study the commerce and industries of the nations where they reside. They will have no other duties. They will collaborate with the consuls, having the advantage of the larger view and of the freedom from other cares.

Consular service.—It is recommended that the consuls shall on purely commercial matters report directly to the Department of Commerce and that they shall cooperate with the commercial attachés in presenting between them a complete and unified knowledge of the commerce and industries of our great competitors. These two forces should normally supplement each other—the attaché has the general field, the consul the particular field. The one collects; the other coordinates. Each supplies with the other that which without him we could not have. Each is at once a corrective and an incentive to the other.

Commercial agents.—It is intended to enlarge this force, which is composed of special investigators trained in their separate lines of study, each pursuing some special theme and for that purpose traveling from country to country wherever information on that subject can be had. A force of from twelve to sixteen men has been employed in this work with excellent results, but obviously that force is quite insufficient, and it is hoped substantially to double it. For this purpose a special appropriation of $100,000 is asked for the study of commercial conditions in South America, and the former sum of $60,000 for the whole world is, in addition to the above, increased to $100,000.

The organization of the Bureau is changed as described herein to provide for the proper direction and control of these forces and funds and to permit following out the duty heretofore imposed by Congress on that Bureau of inquiring into the cost of production at home and abroad, for which purpose a special sum of $100,000 is also asked.

The direct appropriations for the fiscal year 1914 for the Bureau of Foreign and Domestic Commerce (other than printing and contingent expenses for the Bureau in Washington, which are part of the Department appropriation) amounted to $224,860, while the estimates for the fiscal year 1915 for the same Bureau are $592,130, or an increase of $367,270 in the estimates for 1915 over the appropriations for 1914. Details follow under the heading of the Bureau.

The personnel of the Bureau of Foreign and Domestic Commerce during the fiscal year 1914 is about 119 employees. Under the plan contemplated in the estimates for 1915 it is estimated that 200 persons will be employed, or an increase of 81.

It is my belief that the above marks a turning point in American policy toward the great world of commerce and industry abroad and

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that it must be reflected in increased prosperity to our capital and labor at home. It is the counterpoise for our industries of the assistance we are giving to agriculture and means for the workman that which improved methods are already bringing to the farmer.

Since Congress in August, 1912, omitted the appropriation for the collection of figures of internal commerce, the statistics of our domestic commerce have not been gathered. Many protests have been received on this account. In the present state of the law the Bureau of Foreign and Domestic Commerce is without power to secure the reporting of the movements of products in the internal commerce of the country and the machinery in the field for the collection of accurate figures is wanting. The vast movements of products in our coastwise trade are unrecorded. It is earnestly hoped that Congress may clothe the Bureau with power to secure this important information and may permit the use of funds at the disposal of the Bureau for this essential commercial purpose.

INQUIRY INTO EFFICIENCY OF INDUSTRIAL COMBINATIONS.

It is deemed desirable that the Bureau of Corporations shall undertake a study of certain fundamental economic laws on which all our industries are based. There is a growing question in the minds of experienced and thoughtful men as to whether the "trust" form of organization is industrially efficient and whether bigness and bulk are always necessary to production at the lowest cost. It may be conceded that massing of capital and the grouping of great quantities of labor have certain elements of efficiency. They permit research on a large scale. They do away with excessive expense in the maintaining of separate offices and numerous sales organizations. They provide means for the purchase and use of apparatus that can only be employed where production is large. All these things and others like them are unquestionably true and account for much that has been done in promoting the great industrial combinations that are so largely discussed among us. But it is doubtful, at best, whether these favorable elements are all the factors that exist and whether there does not come a point of maximum efficiency at minimum cost beyond which an increase of product means an increase of cost per unit of that product. It is significant that some of the great trusts have ceased to exist; that others pay but moderate dividends, if any, on their securities, and that side by side with the most mighty and supposedly the most efficient of them have grown up independent organizations quite as successful and perhaps earning even more upon their capital than their powerful competitors. Furthermore, it is undoubtedly true that many of the most profitable businesses in the country are those of moderate size and that this is so even in lines where large concerns

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exist of apparently less earning capacity. There is no criticism here of "big business" as such but merely the question as to whether "big business" has not its very marked limitations and whether there are not cases where bigness is rather less desirable than efficiency.

It is not necessary to recite the factors which are believed by many to limit economical production in the overgrown enterprise, particularly if its overgrowth be gained by the aggregation of what were unrelated parts. The purpose of the Bureau of Corporations is to study patiently into the historical facts, financial facts, economic facts, facts of human welfare and human productiveness, facts concerning equipment, handling, storing, selling, management, and the like, in order that we may know whether these bulky things that we have so much feared are in an economic sense real giants in strength or whether they are but images with feet of clay. It is of the utmost importance that the laws which govern these things should be made known, for without knowledge of those laws legislation may be vain. It is a common truth that economic laws are stronger than statute laws. There can be no objection, therefore, on the part of anyone, whatever his views of industry, toward a study which shall determine the truth, which truth, if it be indeed the truth, must itself determine in the final analysis the course which the legislature and the executive may wisely take concerning these matters.

For the purpose of this inquiry and for that of studying into the economic laws governing the control of retail prices on the part of manufacturers a considerable sum is asked. The total of the appropriations for the Bureau of Corporations for the fiscal year 1914 was $253,300. The estimates for the fiscal year 1915 amount to $685,000, or an increase of $431,700 in the estimates for 1915 over appropriations for 1914.

The personnel of the Bureau of Corporations for the fiscal year 1914 will average 120 employees, while the estimated personnel for the fiscal year 1915 will be 343, or an increase of 223 employees.

STUDY OF ECONOMIC LAWS GOVERNING THE FIXING OF RETAIL PRICES.

It is important that we should know the truth about the fixing of retail prices and as to whether giving the privilege of so fixing the prices to a manufacturer tends toward monopoly or does not so tend. Men who are sincere and well informed do not think alike on this problem, but whatever their views it will be agreed that no thorough study has ever been made of the subject in this country. Nations abroad are said to favor by law that which we forbid. The law with us is for the time fixed by the decision of the Supreme Court that the

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fixing of retail prices on the part of manufacturers is unlawful. If, however, new legislation should in the future be required, it is important that the truth be known lest injustice be done, not so much to the manufacturer as to the consumer. Some men, well informed, argue that the fixing of retail prices under conditions where competition in manufacture exists tends to promote competition. Others say that the refusal to permit the fixing of retail prices tends to monopoly because in the cut-throat competition certain to follow obviously the stronger competitor will survive and may eventually have the business in his own hands, for the law forbids the making of agreements to maintain prices, and under these circumstances the weakest must go to the wall. Such being the views expressed by thoughtful men on a matter in which every consumer is interested because he must needs buy such articles, it is important that the subject should receive thoughtful study, and this the Bureau of Corporations purposes to give to it.

GATHERING OF UNDERLYING FACTS CONCERNING PUBLIC-SERVICE CORPORATIONS.

The Bureau of Standards has begun in a moderate way, and rather through the requests of others than of its own initiative, an inquiry into certain elements underlying the work of our public-service corporations. Another item of increase in the estimates for the coming year is that of $100,000 in order that the Bureau may carry this work out systematically. It is important that every city and State shall have at its command as accurate and thorough information concerning the facts which underlie its public utilities as is possessed by the companies that operate those utilities. It is quite as important that the public-service companies should themselves know that the municipalities and States are as well informed on these matters as they are themselves. Such information comes to the public-service companies normally out of the operation of their plants, but such information is not always available now to the public authorities that must regulate the public utilities. These facts are of many kinds—electrical, chemical, physical, etc. The Bureau of Standards has the equipment and the organization and the authority to undertake the study. It lacks the funds, and Congress is requested to provide them. What the Bureau has already done in this direction has saved much in litigation, a great deal of passion, large sums of money, and a great deal of time. Its statements, being known to be unbiased and made without thought of profit, are and will be accepted by all parties in interest to the promotion of peace and to the benefit of every man who lights an electric lamp or rides on a street car.

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INQUIRY INTO COST OF PRODUCTION OF CLOTHING.

It remains to state but one further point of important policy that the Department desires to carry out. It wishes to supplement the inquiry now drawing to a close into the cost of production in the pottery industry by undertaking an inquiry into the cost of production of clothing of all kinds and of different materials, including hosiery, knit goods, and their fellows. It is recalled that not only is this a matter which affects every man and woman in the country but that it is a subject which has been approached several times but which has never received thoughtful study as a whole. The late Tariff Board inquired into the cost of cotton and woolen and worsted cloth and to some extent into the costs of making knit goods and hosiery. It did not, however, pursue its inquiries fully into the cost of making all clothing of various kinds. Different States and municipalities have given study to the important question of wages and labor in the clothing industries and to the working conditions in them. No one to my knowledge has ever correlated the work of the various public and private organizations—national, State, and municipal—and has added to them an inquiry into the fundamental elements of cost in these industries. Such a study should have important social results. It should develop the question as to whether the sweatshop is economically efficient or whether by a properly organized and more scientific method of manufacture it would not be eliminated by the natural operation of economic law.

The inquiry is not one that can be hurried. It has already been begun with a portion of the funds recently appropriated by Congress. It will be continued if the appropriation of $100,000 for this and similar work included in our estimates is made by Congress.

INSUFFICIENT EQUIPMENT OF THE DEPARTMENT.

I regret to find the physical condition of the equipment of the Department in some respects very poor. For example, the 44 lighthouse tenders are, with one exception, without wireless telegraph apparatus. Most of them are seagoing vessels, constantly patrolling our coast, and the nature of their duties makes them peculiarly familiar with its dangers. Loss of life and property may at any time occur because there are no means of summoning these efficient vessels to the help of the distressed.

The salmon agents of the Bureau of Fisheries, whose duty it is to inspect the numerous canneries along the Alaskan coast, are without means of transportation in a territory where there are often no regular transportation lines. They are therefore forced into the absurd

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position of depending upon the canneries, which they must inspect, for the means of travel to make such inspections. This, coupled with the fact that four men can hardly cover well some 25,000 miles of coast, is a condition that should not be allowed to continue. Request has therefore been made of Congress for vessels to provide proper means of transport for the inspectors and an increased force of them.

The lighthouses along our coast are not connected by a telephone system. Telephones were installed during the Spanish war, but they have been allowed to fall into disrepair and are out of use. I know of one wreck near a lighthouse where for lack of a telephone lives were lost, for neither the lighthouse nor the life-saving station close at hand had any means of communication. I do not believe the generous American people desire their lighthouse vessels to be without wireless apparatus, their lighthouses to be without telephones, or their fisheries inspectors to be at the mercy for transportation of the people whom they are supposed to watch. Recommendations have been made to Congress covering all these matters.

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OFFICE OF THE SECRETARY.

OFFICE OF THE CHIEF CLERK.

TRANSFERS TO THE DEPARTMENT OF LABOR.

The act approved March 4, 1913, creating a Department of Labor, transferred from the Department of Commerce and Labor the Commissioner General of Immigration, the commissioners of immigration, the Bureau of Immigration and Naturalization, the Division of Information, the Division of Naturalization, the Immigration Service, the Bureau of Labor, and the Children's Bureau, and all that pertained thereto, and changed the name of this Department to the Department of Commerce. The total number of positions in the aforementioned services at the date of transfer was 1,798, and the value of the property in the bureaus in Washington transferred amounted to $96,298.20.

In addition to the foregoing, 29 positions, with salaries aggregating $24,740 per annum, and furniture and other equipment valued at $9,489.84, were transferred from the Office of the Secretary of Commerce to the Office of the Secretary of Labor, in accordance with the provisions of the acts approved March 4 and May 1, 1913. The 29 positions referred to above do not include one position of clerk at $1,600 per annum transferred by the appropriation act of March 4, 1913, from the Bureau of Immigration and Naturalization to the Office of the Secretary, effective July 1, 1913, as it was dropped from the Secretary's roll on the same date. This position was included in the total number of positions in the Bureau of Immigration and Naturalization transferred to the Department of Labor under the provisions of the act of March 4, 1913, creating that Department.

The positions transferred were as follows: 2 clerks of class 3 at $1,600 per annum each, 5 clerks of class 2 at $1,400 per annum each, 2 clerks of class 1 at $1,200 per annum each, 2 clerks at $1,000 per annum each, 1 clerk at $900 per annum, 1 skilled laborer at $840 per annum, 2 assistant messengers at $720 per annum each, 4 laborers at $660 per annum each, 3 watchmen at $720 per annum each, 2 messenger boys at $480 per annum each, and 5 charwomen at $240 per annum each.

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The following is a complete list of all furniture, equipment, etc., transferred from the Office of the Secretary of Commerce to the Office of the Secretary of Labor:

Articles.	Number.	Value.	Articles.	Number.	Value.
Awnings	94	$146.40	Pads	14	$1.73
Base, wood, for hatrack	1	1.50	Paste, jar, pint	1	.13
Bases, for file cases	25	21.41	Pencil-sharpening machines	3	8.07
Baskets	13	5.16	Penholders	4	.09
Bookcase base and top	1	4.09	Perforators, paper	6	6.01
Boxes, file, Woodruff	16	5.28	Platforms	8	4.96
Brackets, fan	36	72.00	Portables, electric	32	42.20
Cabinets, filing and card-index	51	912.92	Prismatic lighting equipment	1	96.40
Carpet	a 397⅛	549.66	Racks:		
Cases, storage and miscellaneous	78	479.39	Book, desk	1	5.00
Cashier, Brandt automatic	1	147.00	Hat, bent-wood	9	31.50
Chairs	33	158.05	Pen	7	.42
Checks, door	11	30.05	Stamp	12	3.64
Clip, board	1	.22	Rugs	4	95.55
Costumer	1	1.25	Rulers, assorted	7	1.09
Covers, rubber, typewriter	2	No charge.	Safe, burglar-proof	1	462.50
Cups, sponge	15	.69	Screens	16	37.00
Cuspidor, nickeled	1	2.05	Shades:		
Daters	34	64.24	Holophane	247	186.26
Desks	20	508.07	Window	196	187.75
Doors	8	109.04	Shears	6	1.89
Erasers, steel	7	1.75	Shelving, pine	c 200	16.00
Extinguishers, fire	4	46.40	Shovel, scoop	1	1.10
Fans, electric	58	611.60	Stamps	76	7.36
Fire hoe	1	1.60	Stands:		
Fixtures, ceiling	20	36.50	Calendar	3	.18
Glass, plate, desk top	1	3.64	Ink	18	1.84
Grill, iron	1	117.85	Multigraph	1	20.00
Holders	5	10.42	Typewriter	7	27.10
Horses, "Grace" and "Nellie"	2	400.00	Umbrella	3	4.80
Keys, typewriter	b 1	2.45	Stools, assorted	5	16.02
Ladders, step	2	4.00	Switchboard, telegraph	1	40.00
Linoleum	a 1,896½	2,286.38	Tables	2	58.00
Locker, wood	1	5.00	Trays	21	10.80
Mats	11	66.65	Truck, 4-wheel	1	16.20
Mirror, walnut frame	1	8.00	Tumblers	4	.12
Multigraph, Gammeter, No. 4, with type	1	300.00	Typewriters	8	736.00
Numbering machines	5	62.90	Wardrobes	2	60.00
Openers, envelope	3	.18	Weights, paper	12	1.14
			Towels	680	117.20
			Total	.....	9,489.84

a Yards. b Set. c Feet.

The Department has also transferred to the Department of Labor $39,600 from its contingent fund and $84,000 from its printing allotment for the fiscal year ending June 30, 1914.

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REMOVAL OF DEPARTMENT.

During the latter part of September and the first few days in October, 1913, the offices of the Secretary of Commerce and the Bureaus of Foreign and Domestic Commerce, Corporations, Lighthouses, Navigation, and Steamboat-Inspection Service, and the Office of the Solicitor were moved to the building erected under contract for the Department at the corner of Nineteenth Street and Pennsylvania Avenue NW. The building is an eleven-story and basement, modern, fireproof structure, is arranged to meet the needs of the offices and bureaus occupying it, and contains approximately 129,000 square feet of available floor space. The task of moving the Department's bureaus and offices into their present quarters was performed with smoothness and expedition and without interruption to the public business. The moving was begun on September 19 and was completed on October 5, 11 days earlier than the time estimated by the contractor who did the moving. There was no delay in the telephone service, as weeks before the moving began each bureau furnished a statement of the telephone equipment required and the telephone company was directed to pull the requisite number of wires through the conduits. Accordingly, a day before a bureau moved into the building the telephone company was instructed to install the equipment already ordered.

In addition to the bureaus above mentioned, the Bureau of Labor Statistics of the Department of Labor is temporarily located in the new building, having been assigned about 10,700 square feet of floor space.

At the present time all the bureaus that were formerly occupying rented buildings, with the exception of the Bureau of the Census, are accommodated in this building. The latter Bureau still occupies its old quarters at the corner of First and B Streets NW. The owners of the Commerce Building have, however, submitted an informal proposition to the Department to build an addition to the present Commerce Building to contain about 50,000 square feet of available floor space, in order that the Bureau of the Census may be housed in the same building with the Office of the Secretary and the other bureaus of the Department except those that are now in Government-owned buildings. The enlarged building would afford sufficient floor space to accommodate the Bureau of the Census, and the additional rent would be paid from the appropriation for the rental of quarters for that Bureau. The removal of the Bureau of the Census into the same building in which the Office of the Secretary is located would result not only in increased efficiency but in a considerable saving in the cost of maintenance. At the present time

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it requires about $36,000 a year to maintain the Census building, whereas the estimated cost of maintaining the proposed addition to the Commerce Building would not exceed $8,000.

CONSOLIDATION OF STOCK AND SHIPPING SECTIONS.

On moving into its present quarters, the Department consolidated the stock and shipping sections of the Divisions of Publications and Supplies into one section, with ample quarters on the first floor of the building. This combined section has been temporarily placed in charge of a clerk who is under the immediate supervision of the Chief Clerk of the Department. The consolidation has resulted in economy of floor space and will make more efficient the handling and filling of requisitions both from the bureaus in Washington and the various outside services of the Department.

DISBURSING OFFICE.

The itemized statement of the disbursements from the contingent fund of the Department of Commerce and the appropriation for "General expenses, Bureau of Standards," for the fiscal year ended June 30, 1913, required to be submitted to Congress by section 193 of the Revised Statutes of the United States, the itemized statement of expenditures under all appropriations for propagation of food fishes during the fiscal year ended June 30, 1913, required by the act of Congress approved March 3, 1887 (24 Stat., 523), and a statement showing travel on official business by officers and employees (other than the special agents, inspectors, and employees in the discharge of their regular duties, who are required to travel constantly) from Washington to points outside of the District of Columbia during the fiscal year ended June 30, 1913, as required by the act of Congress approved May 22, 1908 (35 Stat., 244), will be transmitted to Congress in the usual form.

APPROPRIATIONS.

The following table shows the total amounts of all annual appriations for the various bureaus and services of the Department of Commerce and Labor for the fiscal year ended June 30, 1913, of all appropriations made for public works in the various services of the Department which, under the law, may be disbursed without regard to any particular year, and of all permanent, indefinite, and deficiency appropriations. The table shows also appropriations for bureaus transferred to the Department of Labor under the act approved March 4, 1913.

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Object of appropriation.	Annual appropriations, 1913.	Appropriations for public works.	Special appropriations and claims.	Total.
Office of Secretary of Commerce and Labor	a $280,830.00		$9,771.95	$290,601.95
Bureau of Corporations	254,200.00			254,200.00
Bureau of Foreign and Domestic Commerce	176,242.41			176,242.41
Bureau of Standards	480,782.66		85,346.48	566,129.14
Bureau of Navigation	163,060.00		b 3,041.21	166,101.21
Steamboat-Inspection Service	534,740.00		b 2.99	534,742.99
Bureau of the Census	1,548,742.58		8,186.00	1,556,928.58
Coast and Geodetic Survey	1,016,020.00	$20,000.00	47.74	1,036,067.74
Bureau of Fisheries	941,790.00		403,129.91	1,344,919.91
Bureau of Lighthouses	5,037,410.00	526,693.00	6,320.68	5,570,423.68
Allotment for printing and binding	c 400,000.00			400,000.00
Total	10,833,817.65	546,693.00	515,846.96	11,896,357.61
Amounts of appropriations made for Department of Commerce and Labor for bureaus transferred to Department of Labor, in accordance with act approved Mar. 4, 1913.				
Bureau of Labor	280,373.67			280,373.67
Bureau of Immigration and Naturalization	2,863,864.45	276,000.00	2,375.11	3,142,239.56
Children's Bureau	21,936.45			21,936.45
Total	3,166,174.57	276,000.00	2,375.11	3,444,549.68
Grand total	13,999,992.22	822,693.00	518,222.07	15,340,907.29

a Includes $15,241.48, transferred to Department of Labor.
b Permanent indefinite appropriations.
c Includes $35,047.40 transferred to Department of Labor.

DISBURSEMENTS.

Disbursements by the Disbursing Clerk, Department of Commerce, during the fiscal year ended June 30, 1913, arranged according to items of appropriation, are shown in the table below. This table shows separately the disbursements during the fiscal year on account of bureaus now in the Department of Commerce and bureaus transferred to the Department of Labor, effective March 4, 1913, under the act of Congress approved March 4, 1913.

BUREAUS NOW IN THE DEPARTMENT OF COMMERCE.

OFFICE OF THE SECRETARY.

Salaries, Office of Secretary of Commerce and Labor, 1912	$7,533.85
Salaries, Office of Secretary of Commerce and Labor, 1913	155,695.50
Contingent expenses, Department of Commerce and Labor, 1911	214.39
Contingent expenses, Department of Commerce and Labor, 1912	19,475.34
Contingent expenses, Department of Commerce and Labor, 1913	86,015.62
Rent, Department of Commerce and Labor, 1912	3,965.11
Rent, Department of Commerce and Labor, 1913	44,890.16
Total	317,789.97

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BUREAU OF CORPORATIONS.

Salaries, Bureau of Corporations, 1912	$3,816.78
Salaries, Bureau of Corporations, 1913	72,215.88
Salaries and expenses, special attorneys, examiners, etc., Bureau of Corporations, 1912	8,078.41
Salaries and expenses, special attorneys, examiners, etc., Bureau of Corporations, 1913	130,243.62
Total	213,854.69

BUREAU OF MANUFACTURES.

Salaries, Bureau of Manufactures, 1912	1,525.05
Salaries, Bureau of Manufactures, 1913	5,189.39
Collating tariffs of foreign countries, 1912	390.68
Collating tariffs of foreign countries, 1913	9,535.85
Salaries and expenses, commercial agents, Department of Commerce and Labor, 1912	1,252.39
Salaries and expenses, commercial agents, Department of Commerce and Labor, 1913	1,515.63
Total	19,408.99

BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

Salaries, Bureau of Foreign and Domestic Commerce, 1913	84,780.48
Promoting commerce, Department of Commerce and Labor, 1913	8,262.76
Total	93,043.24

BUREAU OF STATISTICS.

Salaries, Bureau of Statistics, 1912	3,068.88
Salaries, Bureau of Statistics, 1913	10,598.67
Collecting statistics relating to commerce, 1912	154.17
Collecting statistics relating to commerce, 1913	534.44
Total	14,356.16

BUREAU OF STANDARDS.

Salaries, Bureau of Standards, 1912	9,500.97
Salaries, Bureau of Standards, 1913	217,006.63
Laboratory, Bureau of Standards	101,569.72
Testing machine, Bureau of Standards	26,694.30
Equipment, Bureau of Standards, 1911	3,505.00
Equipment, Bureau of Standards, 1912	6,050.44
Equipment, Bureau of Standards, 1913	28,925.00
General expenses, Bureau of Standards, 1911	4.65
General expenses, Bureau of Standards, 1912	1,870.42
General expenses, Bureau of Standards, 1913	19,429.67
Testing structural materials of the United States	8,350.00
Testing machine at Pittsburgh, Pa., Bureau of Standards	2,925.43

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Improvement and care of grounds, Bureau of Standards, 1912	$318.41
Improvement and care of grounds, Bureau of Standards, 1913	2,585.72
Investigating effects of electric currents, Bureau of Standards, 1912	1,524.42
Investigating effects of electric currents, Bureau of Standards, 1913	9,245.73
Testing machines, Bureau of Standards, 1912	2,867.05
Testing machines, Bureau of Standards, 1913	25,688.37
Testing structural materials, Bureau of Standards, 1912	8,802.10
Testing structural materials, Bureau of Standards, 1913	69,799.74
Refrigeration constants, Bureau of Standards, 1913	9,516.44
Current meter testing tank, Bureau of Standards, 1913	1,270.00
Electrical laboratory equipment, Bureau of Standards, 1913–14	2,160.73
Additional land, Bureau of Standards	68,034.00
Total	627,644.94

BUREAU OF NAVIGATION.

Salaries, Bureau of Navigation, 1912	1,386.71
Salaries, Bureau of Navigation, 1913	31,504.82
Salaries, Shipping Service, 1912	2,578.87
Salaries, Shipping Service, 1913	27,968.63
Clerk hire, Shipping Service, 1912	2,899.35
Clerk hire, Shipping Service, 1913	29,017.47
Contingent expenses, Shipping Service, 1912	2.498.07
Contingent expenses, Shipping Service, 1913	6,861.87
Instruments for measuring vessels and counting passengers, 1912	622.53
Instruments for measuring vessels and counting passengers, 1913	497.37
Enforcement of navigation laws, 1912	7,655.23
Enforcement of navigation laws, 1913	9,240.18
Enforcement of wireless communication laws, 1912	796.50
Enforcement of wireless communication laws, 1913	26,701.30
Total	150,228.90

STEAMBOAT-INSPECTION SERVICE.

Salaries, Office of Supervising Inspector General, Steamboat-Inspection Service, 1912	610.03
Salaries, Office of Supervising Inspector General, Steamboat-Inspection Service, 1913	13,960.53
Salaries, Steamboat-Inspection Service, 1912	28,695.20
Salaries, Steamboat-Inspection Service, 1913	316,947.99
Clerk hire, Steamboat-Inspection Service, 1912	7,070.60
Clerk hire, Steamboat-Inspection Service, 1913	74,835.79
Contingent expenses, Steamboat-Inspection Service	.20
Contingent expenses, Steamboat-Inspection Service, 1912	14,227.64
Contingent expenses, Steamboat-Inspection Service, 1913	69,256.76
Total	525,604.74

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BUREAU OF FISHERIES.

Salaries, Bureau of Fisheries, 1912	$31,471.69
Salaries, Bureau of Fisheries, 1913	337,236.06
Miscellaneous expenses, Bureau of Fisheries, 1911	91.01
Miscellaneous expenses, Bureau of Fisheries, 1912	55,125.15
Miscellaneous expenses, Bureau of Fisheries, 1913	364,275.77
Protecting seal and salmon fisheries of Alaska, 1911–12	8,648.19
Protecting seal and salmon fisheries of Alaska, 1913	67,301.45
Biological station, Mississippi River Valley	29,093.19
Marine biological station, Florida	59.85
Marine biological station, North Carolina	1,791.06
Steamer *Fish Hawk*, repairs	8,098.15
Payment to Great Britain and Japan	400,000.00
Protecting the sponge fisheries, 1912	115.00
Protecting the sponge fisheries, 1913	75.55
Philippine fisheries report	2,303.94
Steam vessel for Alaska	13,000.00
Fish hatcheries:	
Kentucky	7,493.39
Puget Sound, Wash	7,479.06
South Carolina	6,376.87
Upper Mississippi River Valley	9,298.16
Wyoming	185.29
Total	1,349,518.83

BUREAU OF THE CENSUS.

Salaries, Bureau of Census, 1913	545,534.08
Collecting statistics, Bureau of Census, 1913	267,770.27
Cotton statistics, Bureau of Census, 1913	31,439.14
Rent, Bureau of Census, 1913	17,500.00
Tabulating machines, Bureau of Census, 1913	23,138.38
Temporary clerks, Bureau of Census, 1913	108,107.99
Expenses of the Thirteenth Census, 1910–12	7,086.55
Expenses of the Thirteenth Census, 1913	13,896.99
Tobacco statistics, Bureau of Census, 1913	11,812.78
Total	1,026,286.18

BUREAU OF LIGHTHOUSES.

Salaries, Bureau of Lighthouses, 1912	2,792.97
Salaries, Bureau of Lighthouses, 1913	61,338.72
Salaries, lighthouse vessels, 1912	50,229.19
Salaries, lighthouse vessels, 1913	400,562.05
Salaries, Lighthouse Service, 1912	18,275.31
Salaries, Lighthouse Service, 1913	197,844.95
General expenses, Lighthouse Service, 1912	395,748.95
General expenses, Lighthouse Service, 1913	858,418.04
Salaries, keepers of lighthouses, 1911	131.00
Salaries, keepers of lighthouses, 1912	45,479.47
Salaries, keepers of lighthouses, 1913	399,259.45

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Supplies of lighthouses, 1911	$1,056.64
Repairs, etc., of lighthouses, 1911	11,685.88
Expenses of buoyage, 1911	1,040.28
Expenses of light vessels, 1911	6,313.61
Maintenance of lighthouse tenders, 1911	73.14
Repairs of light vessels, 1911	185.22
Expenses of fog signals, 1911	3,883.00
Lighting of rivers, 1911	966.42
Aids to navigation, Alaska	6,212.06
Ambrose Channel buoys, N. Y	50.00
Point Judith lighted buoy, R. I	1,200.00
Edgemoor lighthouse depot, Del	14,600.22
Staten Island lighthouse depot, N. Y	20,756.88
Light keepers' dwellings	4,948.18
Bogue Sound Range Lights, N. C	126.00
Cape Fear River Lights, N. C	17,024.67
Detroit River Lights, Mich	24,070.00
Eagle Point Range Lights, N. J	292.18
Point Judith Breakwater Lights, R. I	1,517.80
St. Marys River Range Lights, Mich	1.50
Superior Pierhead Range Lights, Wis	18,181.26
Tenders:	
First lighthouse district	489.24
Engineer, third lighthouse district	6,921.58
Engineer, sixth lighthouse district	1,125.92
Inspector, eighth lighthouse district	816.00
Fifteenth lighthouse district	219.50
Light vessels:	
Frying Pan Shoals, N. C	682.84
Milwaukee, Wis	17,587.70
Point Abino, Lake Erie	382.31
Relief, ninth and eleventh lighthouse districts	12,561.46
Light stations:	
Brandywine Shoal, Del	67.58
Buffalo Breakwater North End, N. Y	15,045.61
Kauai Island, Hawaii	6,976.90
Lincoln Rock, Alaska	10.06
Lloyd Harbor, N. Y	279.28
Miah Maull Shoal, Delaware Bay	20,281.23
Monhegan Island, Me	305.62
Negro Point, N. Y	1,600.04
North Point, N. Y	7,514.08
Point Loma, Cal	101.00
Punta Gorda, Cal	273.04
San Pedro Breakwater, Cal	20,064.45
Thimble Shoal, Va	6,787.63
White Shoal, Mich	1,164.27
Storehouses for oil	1,398.37
Light vessels for general service	792.14
Battery Point fog signal, Wash	14,140.80
Oil houses for light stations	555.04
Total	2,701,908.58

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Bureaus Now in the Department of Labor.

BUREAU OF LABOR.

Salaries, Bureau of Labor, 1912	$4,235.61
Salaries, Bureau of Labor, 1913	67,185.81
Miscellaneous expenses, Bureau of Labor, 1910	1,000.00
Miscellaneous expenses, Bureau of Labor, 1912	5,346.79
Miscellaneous expenses, Bureau of Labor, 1913	40,648.72
Library, Bureau of Labor, 1912	82.88
Library, Bureau of Labor, 1913	499.78
Medical examination of injured employees, 1912	13.00
Medical examination of injured employees, 1913	194.00
Total	119,206.59

CHILDREN'S BUREAU.

Salaries, Children's Bureau, 1913	9,877.88

BUREAU OF IMMIGRATION AND NATURALIZATION.

Salaries, Bureau of Immigration and Naturalization, 1912	5,818.29
Salaries, Bureau of Immigration and Naturalization, 1913	91,448.79
Immigrant stations:	
Boston, Mass	538.02
Charleston, S. C	34,172.99
Ellis Island, N. Y	25,068.96
Galveston, Tex	8,230.47
New Orleans, La	109,413.03
Philadelphia, Pa	72,926.98
San Francisco, Cal	12,827.06
Expenses of regulating immigration, 1910–11	2,674.85
Expenses of regulating immigration, 1911	2,278.09
Expenses of regulating immigration, 1912	212,196.91
Expenses of regulating immigration, 1913	1,610,381.58
Expenses of regulating immigration (special fund)	149.98
Miscellaneous expenses, Division of Naturalization, 1911	11.70
Miscellaneous expenses, Division of Naturalization, 1912	16,786.14
Miscellaneous expenses, Division of Naturalization, 1913	118,329.24
Payment of fees to Austrian seamen detained at Ellis Island, N. Y	520.00
Refund to Scandinavian-American Line	13.50
Payments to Wm. von Forienger and A. Graham	2,000.00
Total	2,325,736.58

Recapitulation.

Total disbursements on account of bureaus now in the Department of Commerce	$7,039,645.22
Total disbursements on account of bureaus now in the Department of Labor	2,454,821.05
Grand total	9,494,466.27

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The following statement shows the expenditures during the fiscal year ended June 30, 1913, on account of all appropriations under the control of the Department, giving the total amounts disbursed by the various disbursing officers of the Department and miscellaneous receipts for the same period:

By the Disbursing Clerk, Department of Commerce and Labor, on account of salaries and expenses of the Office of the Secretary of Commerce and Labor, the Bureaus of Corporations, Foreign and Domestic Commerce, Labor, Navigation, Immigration and Naturalization, Standards, Fisheries, and Lighthouses, the Office of the Supervising Inspector General, Steamboat-Inspection Service, expenses of regulating immigration, salaries and expenses of Steamboat-Inspection Service at large, and public works of the Immigration and Fisheries Services (shown in detail in the foregoing table of disbursements)		$9,494,466.27
By the authorized disbursing officers of the Lighthouse Service		2,638,396.59
By the special disbursing agent, Coast and Geodetic Survey, on account of salaries and expenses of the Coast and Geodetic Survey		1,009,095.36
By the disbursing clerk, Bureau of the Census, on account of salaries and expenses of the Bureau of the Census		134,856.90
By the special disbursing agents of the Immigration Service		18,329.61
By the commercial agents of the Department investigating trade conditions abroad, as special disbursing agents		44,966.60
By special disbursing agents, Bureau of Fisheries		22,099.11
By customs officers on account of witnesses' fees in steamboat investigations		634.15
By warrants drawn on the Treasurer of the United States to satisfy accounts settled by the Auditor for the State and other Departments, classified as follows:		
Office of the Secretary	$702.13	
Bureau of Foreign and Domestic Commerce	1,291.23	
Bureau of Standards	4,923.77	
Steamboat-Inspection Service	65.50	
Bureau of Navigation	2,781.36	
Bureau of Immigration and Naturalization	[a]2,577.36	
Bureau of Fisheries	9,273.33	
Bureau of Lighthouses	175,853.82	
Bureau of the Census	180,086.76	
Coast and Geodetic Survey	11,305.41	
		388,860.67
Total		13,751,705.26

MISCELLANEOUS RECEIPTS, FISCAL YEAR 1913.

Coast and Geodetic Survey:	
Sale of Charts, Tide Tables, etc	$15,709.88
Sale of property, outside work	1,016.84
Bureau of Standards: Standardizing and testing weights, etc	13,439.48

[a] To Mar. 4, 1913.

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Bureau of Immigration and Naturalization:	
Head tax	[a]$2,767,402.00
Exclusive privileges	[a] 9,853.16
Naturalization fees	[a] 191,361.00
Telephone rentals, etc	[a] 1,372.32
Fines and court costs	[a] 43,493.85
Bureau of Navigation: Navigation fees	158,228.17
Bureau of Fisheries:	
Sale of sealskins	130,640.57
Sale of fox skins	20,505.17
Proceeds of sale of condemned property, etc., by the Department	46,320.66
	3,399,343.10
Other receipts:	
Annual yacht tax	109.34
Tonnage tax	1,273,789.43
Total	4,673,241.87

BALANCES OF APPROPRIATIONS.

The following unexpended balances of appropriations were turned into the surplus fund June 30, 1913, in accordance with the act of June 20, 1874 (18 Stat., 110–111):

Salaries, Office of Secretary of Commerce and Labor, 1911	$1,228.29
Salaries and expenses, commercial agents, Department of Commerce and Labor, 1911	2,693.65
Rent, Department of Commerce and Labor, 1911	2,524.81
Contingent expenses, Department of Commerce and Labor, 1911	7,171.23
Salaries, Bureau of Corporations, 1911	2,938.88
Salaries and expenses, special attorneys, examiners, etc., Bureau of Corporations, 1911	56,459.19
Salaries, Bureau of Manufactures, 1911	1,292.92
Collating tariffs of foreign countries, 1911	10.51
Salaries, Bureau of Standards, 1911	11,887.73
Equipment, Bureau of Standards (certified claim)	5.49
Equipment, Bureau of Standards, 1910	16.79
Equipment, Bureau of Standards, 1911	89.90
Additional land, Bureau of Standards	16,966.00
Testing structural materials, Bureau of Standards, 1911	191.29
General expenses, Bureau of Standards, 1911	69.10
Investigating effects of electric currents, Bureau of Standards, 1911	140.72
Improvement and care of grounds, Bureau of Standards, 1911	214.43
Weights and measures, Bureau of Standards, 1910–11	918.11
Salaries, keepers of lighthouses, 1911	130,938.61
Salaries, Coast and Geodetic Survey, 1911	5,412.78
Party expenses, Coast and Geodetic Survey, 1910–11	9,805.77

[a] These figures include receipts of the Bureau of Immigration and Naturalization for the period from July 1, 1912, to Mar. 4, 1913, the date on which it was transferred to the Department of Labor.

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Party expenses, Coast and Geodetic Survey, 1911	$9,209.98
General expenses, Coast and Geodetic Survey, 1911	453.06
Pay, etc., of officers and men, vessels, Coast Survey, 1911	5,275.81
Repairs of vessels, Coast Survey, 1911	881.72
Salaries, Bureau of Fisheries, 1911	16,580.73
Miscellaneous expenses, Bureau of Fisheries, 1911	3,750.82
Salaries, agents at seal fisheries in Alaska, 1911	432.50
Supplies for native inhabitants of Alaska, 1911	289.16
Salaries, Bureau of Navigation, 1911	530.00
Instruments for measuring vessels and counting passengers, 1911	300.57
Contingent expenses, Shipping Service, 1911	3,582.56
Supplies of lighthouses, 1911	13,632.69
Repairs and incidental expenses of lighthouses, 1910–11	1,279.31
Repairs and incidental expenses of lighthouses, 1911	19,823.44
Expenses of light vessels, 1911	29,635.87
Lighting of rivers, 1911	12,322.57
Salaries, Bureau of Statistics, 1911	865.15
Collecting statistics relating to commerce, 1911	6.96
Salaries Office of Supervising Inspector General, Steamboat-Inspection Service, 1911	161.11
Salaries, Bureau of Lighthouses, 1911	6,137.48
Pay of clerks, Lighthouse Service, 1911	25,477.78
Expenses of buoyage, 1911	16,845.70
Expenses of fog signals, 1911	23,954.81
Eagle Point Range Lights, N. J	4.57
Great Lakes Channel Lights, 1911	2,000.00
Greenville Channel Lighted Buoy, N. J	9,000.00
Neebish Channel Lights, St. Marys River, Mich., 1911	2,541.84
St. Marys River Range Lights, Mich	2,220.25
Southeast Shoal Light Vessel, Lake Erie, 1911	4,000.00
St. Joseph lighthouse depot, Mich	5,354.03
Staten Island lighthouse depot, N. Y	3,750.12
Cleveland Harbor Breakwater Light Station, Ohio	1,561.75
Hinchinbrook Entrance Light Station, Alaska	24,689.10
Lloyd Harbor Light Station, N. Y	7,708.31
Lake Borgne Light Station, Miss	99.06
Punta Gorda Light Station, Cal	635.31
Southwest Light Station, Conn	26,528.34
Split Rock Light Station, Lake Superior	2,622.54
Maintenance of lighthouse tenders, 1911	61,750.04
Repairs to lighthouse tenders, 1911	2,289.13
Repairs to light vessels, 1911	19,809.69
Total	618,970.01

BALANCES OF APPROPRIATIONS TRANSFERRED TO THE DEPARTMENT OF LABOR, IN ACCORDANCE WITH THE PROVISIONS OF THE ACT APPROVED MARCH 4, 1913, CREATING THE DEPARTMENT OF LABOR.

Bureau of Labor:	
Salaries, Bureau of Labor, 1911	$2,235.28
Salaries, Bureau of Labor, 1912	1,822.22
Salaries, Bureau of Labor, 1913	35,097.86

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Bureau of Labor—Continued.	
Miscellaneous expenses, Bureau of Labor, 1910	$1,809.00
Miscellaneous expenses, Bureau of Labor, 1911	3.33
Miscellaneous expenses, Bureau of Labor, 1912	1,167.17
Miscellaneous expenses, Bureau of Labor, 1913	23,488.29
Library, Bureau of Labor, 1911	8.81
Library, Bureau of Labor, 1912	.52
Library, Bureau of Labor, 1913	500.22
Medical examination of injured employees, 1911	2,751.00
Medical examination of injured employees, 1912	2,826.66
Medical examination of injured employees, 1913	2,806.00
Commission on industrial relations, 1913	100,000.00
International Congress on social insurance	10,000.00
Total	184,002.86
Children's Bureau: Salaries, Children's Bureau, 1913	12,058.57
Bureau of Immigration and Naturalization:	
Salaries, Bureau of Immigration and Naturalization, 1911	3,961.29
Salaries, Bureau of Immigration and Naturalization, 1912	3,861.71
Salaries, Bureau of Immigration and Naturalization, 1913	47,415.66
Expenses of regulating immigration, 1911	12,692.41
Expenses of regulating immigration, 1912	56,046.67
Expenses of regulating immigration, 1913	1,049,736.64
Expenses of regulating immigration, 1910–11	10,363.19
Expenses of regulating immigration, 1909 and prior years	593.07
Expenses of regulating immigration (special fund)	2,408.89
Immigrant stations—	
Boston, Mass	310,178.98
Charleston, S. C	3,063.49
Ellis Island, N. Y	280,116.91
Galveston, Tex	11,824.40
New Orleans, La	70,894.54
Philadelphia, Pa	81,495.68
San Francisco, Cal	43,569.91
Special examiners, etc., Division of Naturalization, 1911	4.21
Additional assistants to clerks of courts in naturalization cases	1,496.95
Miscellaneous expenses, Division of Naturalization, 1911	1,625.42
Miscellaneous expenses, Division of Naturalization, 1912	3,110.28
Miscellaneous expenses, Division of Naturalization, 1913	82,059.04
Trust fund, Rosa Goldman	500.00
Unclaimed funds, Jei Bei Ota	2.27
Refund of fine, Rafael Subira	20.00
Total	2,077,041.61
Salaries, Department of Commerce and Labor, 1913	3,013.38
Contingent expenses, Department of Commerce and Labor, 1913	12,228.10
Total	15,241.48
Grand total	2,288,344.02

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DISBURSEMENTS MADE BY THE DISBURSING CLERK, DEPARTMENT OF COMMERCE, WHILE ACTING AS SPECIAL DISBURSING AGENT, DEPARTMENT OF LABOR, DURING THE PERIOD FROM MARCH 4, 1913, TO AND INCLUDING MAY 5, 1913.

Bureau of Labor Statistics:	
Salaries, Bureau of Labor, 1913	$16,348.88
Miscellaneous expenses, Bureau of Labor, 1911	3.38
Miscellaneous expenses, Bureau of Labor, 1912	.20
Miscellaneous expenses, Bureau of Labor, 1913	9,612.20
Library, Bureau of Labor, 1913	233.12
Medical examination of injured employees, 1913	117.00
Total	26,314.78
Bureau of Immigration:	
Salaries, Bureau of Immigration and Naturalization, 1913	23,100.02
Expenses of regulating immigration, 1911	1.56
Expenses of regulating immigration, 1912	1,187.20
Expenses of regulating immigration, 1913	419,111.81
Immigrant stations—	
Ellis Island, N. Y.	1,125.92
Galveston, Tex	3,362.33
New Orleans, La	23,521.88
Philadelphia, Pa	3,519.42
San Francisco, Cal	8,848.62
Total	483,778.76
Bureau of Naturalization:	
Miscellaneous expenses, Division of Naturalization, 1912	1.16
Miscellaneous expenses, Division of Naturalization, 1913	38,793.47
Total	38,794.63
Children's Bureau: Salaries, Children's Bureau, 1913	4,273.33
Grand total	553,161.45

APPOINTMENT DIVISION.

STATISTICS RELATING TO THE PERSONNEL.

The accompanying table shows by bureaus the number of positions in the Department on July 1, 1913, and the increase or decrease in each bureau as compared with August 24, 1912. The latter date is used for the reason that the legislative, executive, and judicial and the sundry civil appropriation acts were not approved until August 23 and 24, respectively. The figures do not include the following employments, appointment to which is not made by the Secretary: Crews on vessels in the Coast and Geodetic Survey, which consisted of 468 employments; employments of persons engaged in rodding, chaining, recording, heliotroping, etc., in field parties of the Survey, of which there were 1,300; temporary employments in the field oper-

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ations of the Bureau of Fisheries, of which there were 3,988; mechanics, skilled tradesmen, and laborers employed in the Lighthouse Service under the authority of Schedule A, Subdivision I, section 12, of the civil-service rules, of which there were 3,130. Neither do they include 56 employees of the Treasury Department, employed under various statutes, on work for this Department in connection with the field work of the Bureau of Navigation. The total miscellaneous employments thus enumerated were 8,942.

Bureau.	Statutory.	Nonstatutory.	Total.	In District of Columbia.	Outside District of Columbia.	Increase (+) or decrease (−).
Office of the Secretary	[a] 139	.....	139	139	.....	− 19
Bureau of the Census	621	755	1,376	[b] 657	719	+ 41
Bureau of Corporations	63	64	127	[b] 127	.....	− 2
Bureau of Foreign and Domestic Commerce	83	25	108	89	19	+ 13
Bureau of Standards	230	82	[c] 312	272	40	+ 32
Bureau of Fisheries	392	6	398	81	317	+ 1
Bureau of Lighthouses	57	5,567	5,624	41	[d] 5,583	+[e] 508
Coast and Geodetic Survey	246	101	347	[b] 264	83	+ 3
Bureau of Navigation	40	55	95	29	66	+ 13
Steamboat-Inspection Service	194	68	262	9	253	.....
Total	2,065	6,723	[f] 8,788	1,708	7,080	+[g] 590

[a] Includes 13 positions transferred to the Department of Labor, Oct. 16, 1913.

[b] Employees engaged in work in the field for a part of each year with headquarters in Washington are treated as within the District of Columbia.

[c] Does not include 5 members of the visiting committee.

[d] Includes the following positions, appointment to which is not made by the head of the Department: 1,575 laborers in charge of post lights, 1,152 members of crews of vessels, and 448 mechanics, skilled tradesmen, and laborers employed in field construction work in the Lighthouse Service and work of a similar character at the general lighthouse depot at Tompkinsville, N. Y.

[e] The increase (508) in the Lighthouse Service is due principally to the inclusion of 448 mechanics, skilled tradesmen, and laborers referred to above and not included in the table of positions as of Aug. 24, 1912.

[f] The total number of positions (8,788) shows a decrease of 1,176 as compared with the total of 9,964 shown as of Aug. 24, 1912, in the last annual report. This decrease is accounted for by the transfer on Mar. 4, 1913, and May 1, 1913, by operation of law, of 1,814 positions to the Department of Labor; 1,798 of these positions being embraced in the Bureau of Labor, Bureau of Immigration and Naturalization, and the Children's Bureau, a net increase of 32 positions in these bureaus over the total of 1,766 positions, reported in the last annual report; 16 positions transferred from the Office of the Secretary and shown in the above table as a part of the decrease (see note [g]); and the net increase of 590 positions reported in this table.

[g] Decrease 21, increase 611, leaving a net increase of 590. The largest decrease was in the Office of the Secretary, and was due to the abolishment of 6 positions Sept. 30, 1912, under the provisions of section 8, of the act of Aug. 23, 1912 (work transferred to the Public Printer), and 16 positions transferred May 1, 1913, to the Department of Labor, under the provisions of the act of May 1, 1913. The authorization of 3 new positions effective July 1, 1913, under the provisions of the act of Mar. 4, 1913, makes a net decrease of 19 positions. (One position of clerk at $1,600 per annum transferred by the appropriation act of Mar. 4, 1913, from the Bureau of Immigration and Naturalization to the Office of the Secretary, effective July 1, 1913, is not included in the foregoing table, as it was dropped from the Secretary's roll on the same date. This position was included in the total number of positions in the Bureau of Immigration and Naturalization transferred to the Department of Labor under the provisions of the act of Mar. 4, 1913, creating that Department.)

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PERSONNEL TRANSFERRED TO THE DEPARTMENT OF LABOR.

The following table shows the bureaus and the number of positions in the Department which were transferred by law (acts approved Mar. 4, 1913, and May 1, 1913) to the Department of Labor. The figures do not include emergency employments, appointment to which is not made by the Secretary, such as guards, interpreters, stenographers, etc., in the field service of the Bureau of Immigration and Naturalization, of which there were 1,029 during the period from July 1, 1912, to the close of February 28, 1913.

Bureau.	Statutory.	Nonstatutory.	Total.	In District of Columbia.	Outside District of Columbia.	Increase (+) or decrease (−).
TRANSFERRED MAR. 4, 1913.						
Bureau of Labor	71	20	[a] 91	[b] 91		− 2
Bureau of Immigration and Naturalization:						
Bureau proper	43		43	43		
Division of Information	12		12	12		
Division of Naturalization	45	[c] 72	117	45	[d] 72	+ 10
Immigration Service		1,520	[e] 1,520	[f] 5	[b] 1,515	+ 24
Children's Bureau	15		15	[b] 15		
TRANSFERRED MAY 1, 1913.						
Office of the Secretary	16		[g] 16	16		
TRANSFERRED OCT. 16, 1913.						
Office of the Secretary	13		13	13		
Total	215	1,612	1,827	240	1,587	+ [h] 32

[a] Does not include 1 temporary special agent and 1 temporary clerk (both nonstatutory).

[b] Employees engaged in work in the field for a part of each year with headquarters in Washington are treated as within the District of Columbia.

[c] Includes 4 vacancies; 1 temporary clerk (lump-sum appropriation) not included.

[d] Includes 2 with headquarters in Washington for local field duty.

[e] Includes 38 vacancies. Does not include 15 temporary employees (job employments), nor 30 positions filled by employees who were connected with other services of the Government and employed occasionally on work for this Department. Does not include 12 employees appointed under the provisions of section 24 of the immigration act of Feb. 20, 1907.

[f] Detailed to the Bureau in accordance with special provisions of law.

[g] Does not include 1 position of clerk at $1,600 per annum. (See note [g] in preceding table.)

[h] Net increase over total for the bureaus on Aug. 24, 1912, shown in last annual report.

CHANGES IN THE PERSONNEL.

The table following gives a summary of the changes in the personnel of the Department during the fiscal year ended June 30, 1913, not including the bureaus transferred to the Department of Labor.

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APPOINTMENTS.[a]

Bureau.	Permanent.				Temporary.	Total.
	Competitive.	Excepted.	Unclassified.	Total.		
Office of the Secretary	22	2	11	35	12	47
Bureau of the Census	123	.....	89	212	388	600
Bureau of Corporations	21	4	1	26	5	31
Bureau of Foreign and Domestic Commerce[b]	13	18	4	35	7	42
Bureau of Standards	65	.....	4	69	25	94
Bureau of Fisheries	38	10	16	64	1	65
Bureau of Lighthouses	340	78	1	419	115	534
Coast and Geodetic Survey	51	1	.....	52	54	106
Bureau of Navigation	23	7	.....	30	28	58
Steamboat-Inspection Service	12	.....	1	13	1	14
Total	708	120	127	955	636	1,591

SEPARATIONS AND MISCELLANEOUS CHANGES.

Bureau.	Separations.[c]						Miscellaneous changes.[d]
	From permanent positions.				From temporary positions.	Total.	
	Competitive.	Excepted.	Unclassified.	Total.			
Office of the Secretary	55	2	9	66	12	78	52
Bureau of the Census	77	2	93	172	386	558	588
Bureau of Corporations	19	5	1	25	7	32	53
Bureau of Foreign and Domestic Commerce[b]	21	10	.....	31	5	36	45
Bureau of Standards	69	.....	1	70	22	92	149
Bureau of Fisheries	33	6	23	62	3	65	59
Bureau of Lighthouses	362	38	.....	400	99	499	865
Coast and Geodetic Survey	56	.....	2	58	43	101	157
Bureau of Navigation	11	7	.....	18	27	45	68
Steamboat-Inspection Service	13	.....	1	14	1	15	12
Total	716	70	130	916	605	1,521	2,048

[a] Includes appointments under Executive orders, reinstatements, transfers within the Department, transfers to the Department from other departments or independent establishments, and presidential appointments.

[b] Includes changes in the Bureau of Manufactures and the Bureau of Statistics before their consolidation into the Bureau of Foreign and Domestic Commerce on Aug. 23, 1912.

[c] Includes separations by removals without prejudice or on charges, resignations, deaths, discontinuance of probationary appointees, transfers within the Department or from the Department to other departments or independent establishments.

[d] Includes promotions; reductions; changes of appropriation, designation, name, or station; cancellation of appointment certificates, etc.

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The following table gives a summary of the changes in the personnel of the bureaus which were transferred to the Department of Labor in accordance with the provisions of the act of March 4, 1913, for the period from July 1, 1912, to February 28, 1913:

APPOINTMENTS.[a]

Bureau.	Permanent.				Temporary.	Total.
	Competitive.	Excepted.	Unclassified.	Total.		
Bureau of Immigration	89	29	27	145	67	212
Division of Naturalization	16	.....	.....	16	4	20
Bureau of Labor	.....	.....	.....	.....	12	12
Children's Bureau	16	1	1	18	1	19
Total	121	30	28	179	84	263

SEPARATIONS AND MISCELLANEOUS CHANGES.

Bureau.	Separations.[b]						Miscellaneous changes.[c]
	From permanent positions.				From temporary positions.	Total.	
	Competitive.	Excepted.	Unclassified.	Total.			
Bureau of Immigration	81	36	21	138	53	191	316
Division of Naturalization	12	.....	.....	12	4	16	65
Bureau of Labor	2	.....	.....	2	13	15	21
Children's Bureau	3	.....	.....	3	1	4	.....
Total	98	36	21	155	71	226	402

[a] Includes appointments under Executive orders, reinstatements, transfers within the Department, transfers to the Department from other departments or independent establishments, and presidential appointments.

[b] Includes separations by removals without prejudice or on charges, resignations, deaths, discontinuance of probationary appointees, transfers within the Department or from the Department to other departments or independent establishments.

[c] Includes promotions; reductions; changes of appropriation, designation, name, or station; cancellation of appointment certificates, etc.

TEMPORARY APPOINTMENTS IN THE BUREAU OF THE CENSUS.

In addition to the regular force provided for the Bureau of the Census in the legislative, executive, and judicial appropriation act approved August 23, 1912, that act authorized the appointment for such time as might be necessary, but not beyond June 30, 1913, of not exceeding 175 temporary clerks from among the employees of the Thirteenth Census force, such clerks to be paid salaries not greater than $900 per annum or on a piece-price basis. For the payment of the compensation of these clerks the sum of $120,000 was appropriated. The limitation placed on the number of temporary clerks thus

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authorized was removed by a provision in the legislative, executive, and judicial appropriation act approved March 4, 1913, but no additional amount was appropriated. Under this authority the Department increased the number of temporary clerkships to 275. As there were about 3,000 former Thirteenth Census employees who were eligible for appointment to these positions, it was obviously desirable to establish some plan which would properly and economically restrict the selections to a small group of eligibles, and, while not legally necessary, it was also deemed desirable to apportion the appointments as far as practicable among the various States and the District of Columbia according to population. With these ends in view, the following regulations were adopted:

1. Appointments were apportioned among the States and the District of Columbia according to population, preference being given to those persons who were immediately available (in the District of Columbia or within a radius of 20 miles from the center thereof). In the event any State was unable to supply its quota, selections were made from the State which, in the opinion of the Bureau, furnished the most desirable candidates.

2. Further preference was given those having had sufficient experience in operating tabulating, sorting, or punching machines to make them familiar with such work.

3. In general, those having the highest efficiency ratings during their Thirteenth Census employment were given preference subordinate to that given in regulations 1 and 2.

4. Entrance salary was $720 per annum, without promise of promotion.

5. Leave regulations were the same as for the Thirteenth Census force, namely, annual and sick leave accrued at the rate of 2½ days a month, all sick leave to be supported by a doctor's certificate.

6. Appointments contained a clause limiting service to June 30, 1913, but subject to termination at any time.

PRESIDENTIAL POSITIONS.

The following table shows the presidential positions in the Department on July 1, 1913. Those marked with an asterisk (*) do not require confirmation by the Senate. There was a reduction of 18 presidential positions during the year, caused by the transfer of 10 positions to the Department of Labor and by a change in the manner of making appointment to 8 in the Alaskan Service of the Bureau of Fisheries. These positions are shown in subsequent tables.

Position.	Compensation.	Tenure.	Authority.
Secretary of Commerce	$12,000	Indefinite	32 Stat., 825.
*Assistant Secretary of Commerce	5,000	do	Do.
Director of the Census	6,000	do	32 Stat., 51.
*Commissioner of Corporations	5,000	do	32 Stat., 827.
Deputy Commissioner of Corporations	3,500	do	Do.

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Position.	Compensation.	Tenure.	Authority.
Chief of Bureau of Foreign and Domestic Commerce.	$4,000	Indefinite	Act Aug. 23, 1912.
Assistant Chief of Bureau of Foreign and Domestic Commerce.	3,000	do	Do.
Do	2,750	do	Do.
Director of the Bureau of Standards	6,000	do	31 Stat., 1449.
Commissioner of Fish and Fisheries	6,000	do	25 Stat., 1.
Deputy Commissioner of Fisheries	3,500	do	32 Stat., 1102.
*Commissioner of Lighthouses	5,000	do	36 Stat., 827.
*Deputy Commissioner of Lighthouses	4,000	do	Do.
*Chief Constructing Engineer, Bureau of Lighthouses.	4,000	do	Do.
*Superintendent of Naval Construction, Bureau of Lighthouses.	3,000	do	Do.
Superintendent of the Coast and Geodetic Survey	6,000	do	25 Stat., 949.
Commissioner of Navigation	4,000	do	23 Stat., 118.
Supervising Inspector General, Steamboat-Inspection Service.	4,000	do	R. S., 4402.
Ten supervising inspectors of steam vessels (with headquarters at San Francisco, Cal.; New York, N. Y.; Norfolk, Va.; St. Louis, Mo.; Boston, Mass.; Louisville, Ky.; Pittsburgh, Pa.; Detroit, Mich.; Cleveland, Ohio; and New Orleans, La.), each.	3,000	do	R. S. 4404.

The following presidential positions were transferred to the Department of Labor, effective March 4, 1913, by the act approved March 4, 1913, creating that Department:

Position.	Compensation.	Tenure.	Authority.
Commissioner of Labor Statistics	$5,000	Term of 4 years unless sooner removed.	25 Stat., 182.
Commissioner General of Immigration	5,000	Indefinite	28 Stat., 780.
Commissioner of immigration at the ports of—			
New York, N. Y	6,500	Term of 4 years unless sooner removed and until successor is appointed.	28 Stat., 391.
Baltimore, Md	4,000	do	Do.
Boston, Mass	4,000	do	Do.
Philadelphia, Pa	4,000	do	Do.
San Francisco, Cal	4,000	do	Do.
San Juan, P. R	3,600	do	Do.
Seattle, Wash	4,000	do	Do.
Chief of the Children's Bureau	5,000	Indefinite	Act Apr. 9, 1912.

The sundry civil appropriation act approved June 23, 1913, provided that appointments to the following-named positions, which had theretofore been made by the President and confirmed by the Senate, be made by the Secretary of Commerce.

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Position.	Compensation.	Tenure.	Authority.
Agent, Alaska salmon fisheries	$2,500	Indefinite	33 Stat., 478.
Assistant agent, Alaska salmon fisheries	2,600	.....do	Do.
Do	1,800	.....do	36 Stat., 1439.
Warden, Alaska service	1,200	.....do	Do.
Deputy warden, Alaska service (4 positions)	a 900	.....do	Do.

a The compensation of these positions was increased from $600 to $900 per annum, effective July 1, 1913.

CREATION OF THE BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

The act making appropriation for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June 30, 1913, approved August 23, 1912, consolidated the Bureau of Manufactures and the Bureau of Statistics into a bureau, to be known as the Bureau of Foreign and Domestic Commerce. The positions authorized for the new bureau as compared with those provided for the Bureaus of Manufactures and Statistics for the preceding fiscal year, as well as the increases and decreases in the various classes of positions, are shown in the following table:

Position.	Bureau of Foreign and Domestic Commerce.		Bureau of Manufactures.		Bureau of Statistics.		Increase.		Decrease.	
	No.	Salary.	No.	Salary.	No.	Salary.	No.	Salary.	No.	Salary.
Chief of Bureau	1	$4,000	1	$4,000	1	$4,000	....	.....	1	$4,000
Assistant Chief of Bureau	1	3,000	....	.....	....	.....	1	$3,000	....	.....
Do	1	2,750	....	.....	....	.....	1	2,750	....	.....
Do	....	.....	1	2,500	....	.....	....	.....	1	2,500
Chief of Division of Consular Reports	1	2,500	....	.....	....	.....	1	2,500	....	.....
Chief of division	....	.....	1	2,100	....	.....	....	.....	1	2,100
Do	....	.....	....	.....	1	2,000	....	.....	1	2,000
Chief clerk	1	2,250	....	.....	1	2,250	....	.....	....	.....
Stenographer to Chief of Bureau	1	1,600	1	1,600	....	.....	....	.....	....	.....
Clerks, class 4	7	1,800	2	1,800	5	1,800	....	.....	....	.....
Clerks, class 3	5	1,600	2	1,600	5	1,600	....	.....	2	1,600
Clerk	1	1,500	....	.....	1	1,500	....	.....	....	.....
Clerks, class 2	11	1,400	3	1,400	9	1,400	....	.....	1	1,400
Clerks, class 1	14	1,200	4	1,200	11	1,200	....	.....	1	1,200
Clerks	17	1,000	4	1,000	13	1,000	....	.....	....	.....
Do	11	900	5	900	6	900	....	.....	....	.....
Messenger	1	840	....	.....	1	840	....	.....	....	.....
Assistant messengers	5	720	2	720	1	720	2	720	....	.....
Laborers	4	660	1	660	1	660	2	660	....	.....
Laborer	1	480	....	.....	1	480	....	.....	....	.....
Total	83	104,860	27	36,600	57	73,650	7	11,010	a 8	b 16,400

a Net decrease of 1. b Net decrease of $5,390.

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In addition to the reduction of $5,390 in the appropriation for the statutory force, indicated above, the $4,000 appropriation for the collection of facts relating to the internal and foreign commerce of the United States, under which one chief of division at $2,500 per annum and one clerk at $1,200 per annum had been employed in the Bureau of Statistics, was not provided for after August 23, 1912. Thus the total reduction in expenditures for salaries was $9,090.

In view of the reduction in the number of positions in the higher classes, it was necessary to make a readjustment of the forces of the two bureaus, which resulted in the appointment of one chief of division as commercial agent, the demotion of one chief of division and 19 clerks, and the transfer of three clerks to the Bureau of the Census.

EFFICIENCY RECORDS.

The first step toward securing efficiency records in the Department was taken in March, 1906, when the Civil Service Commission, by direction of the President, requested each executive department and independent bureau to furnish full lists of all superannuated employees, with information as to their efficiency ratings and how many of them were veterans. These lists, with the ratings, were obtained from the bureaus of this Department and promptly transmitted to the Civil Service Commission. Later in the year the Department decided to obtain the same information in regard to the efficiency of all of its officers and employees below the presidential class, regardless of the superannuation and the military or naval feature involved in the previous investigation. The ratings thus obtained were used to a considerable extent in considering recommendations for promotion. In each of the investigations made in 1906 the efficiency records were based solely upon the judgment and reports of the bureau officers.

A second investigation into the efficiency of the personnel of the Department was conducted in the summer of 1909, and a third during the summer of 1911. The efficiency ratings thus established were consulted whenever recommendations for promotions were received, and if it appeared that employees not having the highest ratings were recommended for advancement the bureau officers were called upon for a statement of the reasons for the action proposed.

By section 4 of the act approved August 23, 1912 (legislative, etc., appropriation act for the fiscal year 1913), Congress has by implication apparently taken out of the hands of the several executive departments the work of maintaining efficiency records for the classified service (at least in the District of Columbia) and placed it under the Civil Service Commission. As a later act, approved March 4, 1913,

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provided that the Commission should investigate and report to the President, with its recommendations, with respect to the administrative needs of the service relating to personnel in the several executive departments and independent establishments in the District of Columbia, and report to Congress details of expenditure and of progress of work at the beginning of each regular session, it did not appear entirely feasible or desirable to make a separate investigation into the efficiency of employees of this Department immediately prior to that to be made by the Commission. For present purposes the latest efficiency records, compiled in the summer of 1911, are used as the basis for promotions, care being taken to see that any changed conditions in the personnel caused by the lapse of time are taken into account. It is the aim of the Department to see that in each case the person promoted is, of the class in which he is employed, the one most entitled to advancement.

PROMOTIONS.

It is the policy of the Department to fill vacancies by the promotion of employees from the classes below. The lowest class, if not filled by transfer or reinstatement, is filled by selection from the civil-service registers. It is desirable that this policy be continued, for the reason that it will inspire the working force with the sense that their interests are considered and assure them that by faithful service they will be given fair consideration in connection with such opportunities for advancement as may occur.

During the year the Department's Chief Clerk and Superintendent resigned and, in keeping with the policy outlined, the vacancy was filled by the promotion of one of the division chiefs in the Office of the Secretary, and the resulting vacancies down to the lowest class were similarly filled. A deputy chief of a bureau was appointed as head of the bureau to fill a vacancy, and a local inspector of boilers was appointed as supervising inspector of a district in the Steamboat-Inspection Service, both of the vacancies being in presidential grades.

LAW OF APPORTIONMENT.

In the early part of this year the President's Commission on Economy and Efficiency submitted to the President a special report on the apportionment of appointments in the departments at Washington, as provided for in the following provision of section 2 of the civil-service act of January 16, 1883:

> Appointments to the public service * * * in the departments at Washington shall be apportioned among the several States and Territories and the District of Columbia upon the basis of population as ascertained at the last preceding census.

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The same section of the act also provides that appointments are to be so apportioned "as nearly as the conditions of good administration will warrant."

The President's Commission in its report objected not so much to the law itself as it did to its interpretation and application by the Civil Service Commission. Among other things it stated:

> After an exhaustive study of the records of the Civil Service Commission and of the evidence which was obtained from the departments * * *, the President's Commission has come to the conclusion that the interpretation which has been given to the act by the Civil Service Commission has been such as practically to defeat its primary purpose; that instead of giving to applicants the benefit of competitive examinations, and instead of giving to the service the benefit of rules adopted for "testing the fitness of applicants"; instead of making available to the Government persons who had by the rules established been given a rating of superior merit, every "condition of good administration" has been made subordinate and subservient to demands that can find no explanation except a desire to continue a system which the law was designed to supplant. Practically the only effect of the law as interpreted had been to eliminate from the possibility of appointment to positions in the classified service such persons as had entirely failed to obtain any standing whatever, i. e., to obtain an average above the passing mark.

For many reasons it is doubtless desirable to have employees of the civil branch of the Government represent the various States and sections of the country, but it is more than doubtful whether such a policy is of sufficient importance to wholly outweigh the tests which are now provided to determine the merit and qualifications of applicants for the service. In any event, it has been found to be impossible, notwithstanding the efforts of the Civil Service Commission, to maintain even an approximate equilibrium between the number of appointments to which the States are entitled and those which they actually receive. If the provision of law requiring the apportionment of appointments is to continue in force, the Department concurs in the view expressed by the President's Commission that it should be regarded as being only coordinate with the provisions contained in the same section of the civil-service act which requires that selections shall be made "according to grade from among those graded highest as the results of * * * competitive examinations." Either the repeal of the law requiring the apportionment of appointments or its subordination to that providing for the selection of persons from among those graded highest in open competitive examinations, would result in the vitalization of the whole civil-service system. It certainly is not in the interest of good administration to require an appointing officer to make a selection from a certificate of eligibles with comparatively low ratings, say from 70 to 75, when there are eligibles on the register with ratings from 5 to 10 points higher.

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The law of apportionment also applies to all transfers from the nonapportioned to the apportioned service, whether intradepartmental or interdepartmental. In a number of instances the Department has been inconvenienced because the Civil Service Commission has not felt at liberty to authorize transfers from the nonapportioned to the apportioned service on the ground that the persons whose transfers were requested were residents of States or Territories which had received an excessive share of appointments. Under the provisions of clause (*c*), section 8, of civil-service Rule X, the Commission has authority to waive the apportionment upon the certificate of the appointing officer that the transfer requested is in the interest of good administration, and setting forth in detail the reasons therefor. It is believed that the appointing officer should be the sole judge as to the qualifications of a person whom he desires to transfer to his department, and that a certificate to the effect that the transfer is in the interest of good administration should be accepted as sufficient ground for action.

SUPERANNUATION AND RETIREMENT.

The problem of utilizing the services of aged employees to the best advantage is constantly becoming more difficult of solution. The growing volume of work, the demand for increased efficiency, and the introduction of new methods and ideas require the services of men and women whose minds are active and capable of development. It seems inconsistent that the Government should expend large sums of money in attempting to procure properly equipped eligibles to enter its employ and at the same time retain on its rolls those who have long passed their usefulness. The heads of bureaus are reluctant to discontinue the services of superannuated clerks, for to do so would in most cases deprive the latter of their only source of income. Demotion is but a palliation, and does not fully meet the difficulties of the case. It would therefore seem to be only just to provide in some manner for the retirement of such employees on annuities at least partly commensurate with the rates of pay which they have been receiving. In some cases the reduction of force possible through the greater efficiency of younger men and women would go far to meet the cost of these annuities.

LIGHTHOUSE SERVICE.

The placing of the Lighthouse Service upon a civilian basis has been practically completed. During the fiscal year 1913 civilian inspectors replaced the Navy officers in charge of the ninth, eleventh, twelfth, and nineteenth districts, the only districts which remained in charge of such officers. The thirteenth, fourteenth, and fifteenth districts, which include the Mississippi River and its tributaries, are

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still under the supervision of Army engineers, the act of June 17, 1910, providing for a Bureau of Lighthouses and for other purposes, having authorized the President to assign Army engineers to act in lieu of civilian inspectors in those districts for an indefinite period.

On January 28, 1913, the Department adopted new regulations for the Lighthouse Service, the effect of which was to place all civil-service matters pertaining to noneducational competitive classified positions in this service under the direct supervision of the district secretaries of the Civil Service Commission.

DIVISION OF PUBLICATIONS.

VOLUME AND COST OF PRINTING.

The regular allotment to the Department for printing and binding for the fiscal year 1913 was $400,000, which was an increase of $25,000 over that for the previous year. This increase was granted by Congress in order that the printing and binding for the Bureau of the Census (except that in connection with inquiries of the Thirteenth Decennial Census), which had since 1909 been paid for from lump appropriations for the Thirteenth Census, could be paid for from the allotment to the Department. Of the $400,000 thus made available, $399,996.86 was expended, leaving an unexpended balance of $3.14. Of the total allotment to the Department, $76,750 was suballotted on August 30, 1912, to the several bureaus, offices, and services transferred to the Department of Labor by the act of March 4, 1913, creating that Department. Of the $76,750 so suballotted there was expended for those bureaus, offices, and services up to May 5, 1913, $41,702.60, leaving a balance of $35,047.40, which amount was transferred to the Department of Labor on May 9, 1913.

In addition to the $399,996.86 expended from the general allotment for 1913, the Department furnished printing and binding to the Bureau of Navigation for the Radio Service costing $1,716.58, for which it was reimbursed from the appropriation "Enforcement of wireless communication laws, 1913"; also it furnished work to the Bureau of the Census costing $5,011.48, of which $383.29 was reimbursed from the appropriation "Tobacco statistics, Bureau of the Census, 1913," and $4,628.19 was reimbursed from the appropriation "Cotton statistics, Bureau of the Census, 1913." These additional expenditures aggregated $6,728.06 and made a grand total of $406,724.92 expended by the Department during the year, as compared with a total of $374,995.64 in 1912.

The increase in expenditures in 1913 over 1912 was $31,729.28. The total expenditures in 1913, however, include $38,270.24 for the Bureau of the Census, while the figures for 1912 are exclusive of expenditures for that Bureau, printing and binding for which in 1912 was paid for from appropriations for the Thirteenth Decennial

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Census. Deducting expenditures for the Bureau of the Census in 1913 and comparing the remainder ($368,454.68) with expenditures for all the other bureaus, offices, and services of the Department in 1912 ($374,995.64) shows that there was a decrease of $6,540.96 in such expenditures. Carrying the comparison still further and omitting also expenditures in both years for the bureaus, offices, and services transferred to the Department of Labor, there was a decrease of $8,963.07. The suballotments in 1913 to the several branches of the Department of Labor totaled $2,422.11 more than their expenditures in 1912.

During the fiscal year 1913 the Department issued on the Public Printer 3,634 requisitions for printing and binding, as compared with 3,466 during the preceding fiscal year, an increase of 168. The number for 1913 includes requisitions covering work ordered only up to and including May 5, 1913, for the bureaus, offices, and services transferred to the Department of Labor.

The following statement shows the amount and cost of each class of work called for by requisitions on the Public Printer during the fiscal year 1913, and affords a comparison with the amount and cost of these classes during the preceding two fiscal years:

Class.	1911		1912		1913 [a]	
	Number.	*Cost.*	*Number.*	*Cost.*	*Number.*	*Cost.*
Blank forms	12,378,007	$51,369.94	12,269,911	$51,112.95	13,102,505	$44,791.41
Reports, pamphlets, etc	5,276,080	269,387.99	6,935,745	288,017.67	7,452,145	295,746.69
Letterheads	2,254,000	4,209.92	2,110,000	3,830.71	2,101,500	3,247.41
Envelopes	[b] 98,250	175.10	46,225	156.19	48,045	173.70
Circulars, decisions, and notices	370,525	2,986.76	308,450	1,882.06	158,650	820.00
Index cards	1,644,500	1,397.56	689,200	692.25	854,900	782.26
Guide cards and folders	623,310	2,352.07	595,150	1,826.50	205,900	1,126.57
Memorandum sheets	3,506,700	2,665.06	1,156,400	1,252.48	4,699,600	2,340.84
Blank books	28,069	30,103.46	19,113	23,064.25	30,818	16,081.81
Miscellaneous books (binding)	2,858	5,448.64	1,355	2,532.35	3,206	5,003.34
Miscellaneous	.....	71.25	.....	628.23	.....	1,563.49
Transferred to Department of Labor on May 9, 1913	.....	.....	.....	.....	.....	35,047.40
Total	.....	370,167.75	.....	374,995.64	.....	[c] 406,724.92

[a] Figures in these columns are for the several classes of work for the Department of Commerce and Labor from July 1, 1912, to Mar. 4, 1913; for the Department of Commerce from Mar. 5, 1913, to June 30, 1913; and for the Department of Labor from Mar. 5, 1913, to May 5, 1913.

[b] Of these, 40,000 were synopsis envelopes for the Customs Service, which in 1912 and 1913 are included in blank forms.

[c] Of this sum $6,728.06 covers printing and binding done for the Bureau of Navigation and the Bureau of the Census for which the Department's allotment was reimbursed.

The table following shows the cost of printing and binding for each of the bureaus, offices, and services of the Department during the fiscal years 1912 and 1913, together with the increase or decrease for each bureau, office, and service and the estimated cost of the work on hand but not completed June 30, 1913.

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Bureau, office, or service.	Cost of work delivered.		Increase (+) or decrease (−).		Estimated cost of work not completed June 30, 1913.
	1912	1913	Cost.	Per cent.	
Office of the Secretary	$12,900.75	$19,408.28	+$6,507.53	+ 50.44	$1,571.71
Appointment Division	401.13	396.05	− 5.08	− 1.27	36.18
Disbursing Office	756.06	1,133.42	+ 377.36	+ 49.91	164.19
Division of Supplies	261.01	363.75	+ 102.74	+ 39.36	3.50
Bureau of Corporations	9,299.40	11,524.50	+ 2,225.10	+ 23.93	56.95
Bureau of Foreign and Domestic Commerce	[a]145,778.58	142,818.07	− 2,960.51	− 2.03	8,586.07
Coast and Geodetic Survey	31,267.82	26,526.52	− 4,741.30	− 15.16	4,757.98
Bureau of Fisheries	9,740.45	12,897.91	+ 3,157.46	+ 32.42	1,896.86
Bureau of Navigation	12,321.44	[b]12,130.37	− 191.07	− 1.55	96.00
Shipping Service	2,669.20	2,032.81	− 636.39	− 23.84	322.59
Radio Service	88.57	1,102.21	+ 1,013.64	+1,144.45	123.59
Office, Supervising Inspector General	4,278.54	2,456.71	− 1,821.83	− 42.58	6.31
Steamboat-Inspection Service	10,630.73	6,767.34	− 3,863.39	− 36.34	1,316.95
Bureau of Lighthouses	18,168.35	20,219.62	+ 2,051.27	+ 11.29	1,407.37
Lighthouse Service	9,223.16	6,716.44	− 2,506.72	− 27.18	876.94
Bureau of Standards	20,475.67	18,278.49	− 2,197.18	− 10.73	3,187.20
Customs Service	12,406.89	6,932.19	− 5,474.70	− 44.13	2,996.90
Bureau of the Census	[c]	[d]38,270.24	.....	.....	5,252.91
Total, Department of Commerce	300,667.75	329,974.92	+29,307.17	+ 9.75	32,660.20
Bureaus, offices, and services transferred to Department of Labor	74,327.89	[e]76,750.00	+ 2,422.11	+ 3.26	.....
Grand total	374,995.64	[f]406,724.92	+31,729.28	+ 8.46	.....

[a] This amount was expended jointly during 1912 by the Bureau of Manufactures and the Bureau of Statistics, which were consolidated into the Bureau of Foreign and Domestic Commerce on Aug. 23, 1912.

[b] Of this amount $1,716.58 covers printing done for the Radio Service, and the Department's allotment for printing and binding was reimbursed to that extent.

[c] Printing and binding for the Bureau of the Census was paid for in 1912 from appropriations for the Thirteenth Decennial Census.

[d] Of this amount $5,011.43 covers printing done in connection with publishing statistics of cotton and tobacco, and the Department's allotment for printing and binding was reimbursed to that extent.

[e] Of this amount $41,702.60 was expended by the Department up to May 5, 1913, and the balance ($35,047.40) was transferred to the Department of Labor on May 9, 1913.

[f] Of this amount $6,723.06 covers printing done for the Bureau of Navigation and the Bureau of the Census for which the Department's allotment was reimbursed.

DISTRIBUTION OF PRINTED SUPPLIES.

There were received and filled during the past year 8,823 requisitions from the various outside services of the Department calling for 8,330,606 blank forms, against 8,093,849 in 1912, and 298,044 books and pamphlets, compared with 315,203 in 1912. There were also received and filled during the year from offices and bureaus of the Department in Washington 360 and from the outside services 369 requisitions for printed stationery, a total of 729, compared with 720 in the preceding year. The 729 requisitions called for 4,270,000 envelopes, 2,039,000 letterheads, 3,146,000 memorandum sheets, 7,700 stenographers' notebooks, 5,200 blank books, 661,000 index and guide cards, 48,000 vertical folders, and 222,000 blank forms.

The filling of the requisitions for blank books, blank forms, and stationery required the making up and forwarding of 15,609 pack-

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ages, boxes, and bags, weighing 317,520 pounds, or 159 tons, against 14,967, weighing 293,652 pounds, or 147 tons, in 1912. The writing and forwarding of 11,500 letters and invoices was also required.

PUBLICATION WORK.

During the fiscal year 1913 the Department issued 901 publications, compared with 887 in the fiscal year 1912, 26 of which, against 31 in 1912, were printed in two or more editions during the year, while 76, compared with 51 in the preceding year, were reprints, without change, of issues of earlier years. The publications issued in 1913 contained a total of 50,560 printed pages, compared with 54,702 in 1912, and there were issued of them for the Department a grand total of 7,522,155 copies, against 7,144,490 in the preceding year, an increase of 377,665 copies.

The publication work of each bureau of the Department for the past two fiscal years is summarized in the following table. The table does not, however, include any publications issued by the Bureau of the Census during the fiscal year 1912 or Thirteenth Census publications issued by that Bureau in 1913, owing to the fact that these publications were not paid for from the allotment to the Department. Publications issued by the Children's, Immigration, Naturalization, and Labor Statistics Bureaus after they became parts of the Department of Labor are also omitted from the figures for 1913.

Bureau.	Publications.		Pages.		Copies printed for Department.		Cost, 1913.
	1912	1913	1912	1913	1912	1913	
Office of the Secretary	36	50	1,706	2,560	213,350	92,850	$7,393.37
Census Bureau [a]	.....	30	.....	2,247	.....	191,700	48,766.20
Children's Bureau [b]	.....	2	.....	87	.....	10,500	198.93
Coast and Geodetic Survey	35	25	4,958	2,070	67,650	31,500	16,450.74
Corporations Bureau	16	19	3,019	3,954	28,700	33,225	14,553.78
Fisheries Bureau	44	49	3,530	2,516	31,775	44,225	12,494.91
Foreign and Domestic Commerce Bureau [c]	440	428	15,387	16,343	5,789,565	6,264,435	135,270.79
Immigration and Naturalization Bureau	50	27	1,341	839	139,575	92,725	5,169.70
Labor Bureau	38	29	12,375	8,127	153,600	132,000	20,351.75
Lighthouse Bureau	105	105	3,023	3,147	238,375	256,695	22,087.51
Navigation Bureau	9	16	3,051	2,239	15,600	74,600	10,998.50
Standards Bureau	95	108	4,765	5,272	88,150	86,700	12,857.91
Steamboat-Inspection Service	19	13	1,547	1,159	378,150	211,000	6,511.71
Total	887	901	54,702	50,560	7,144,490	7,522,155	[d] 313,105.80

[a] Publications of the Census Bureau paid for in 1912 from appropriations for the Thirteenth Decennial Census.

[b] Children's Bureau issued no publications in 1912, not being in existence during that year.

[c] Figures for 1912 are those of the Bureau of Manufactures and Bureau of Statistics jointly, these two Bureaus having been consolidated into the Bureau of Foreign and Domestic Commerce by the act of Aug. 23, 1912.

[d] Figures relate to publications actually becoming available during the year for distribution; consequently they do not agree with similar figures in a preceding table giving the cost of work done by the Government Printing Office during the fiscal year. Frequently the cost of a publication is charged against allotments for two or more fiscal year.

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DISTRIBUTION OF PUBLICATIONS.

The work of addressing, wrapping, mailing, or otherwise dispatching publications for public distribution was transferred from the executive departments to the Government Printing Office (Superintendent of Documents) by section 8 of the act approved August 23, 1912, making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year 1913. The act required also that all machines, equipment, and materials used in such work be turned over to the Public Printer before October 1, 1912. The Department complied with this requirement during the month of September, 1912, and a statement of the number of publications and a list of the machines, equipment, and materials transferred to the Superintendent of Documents, together with a statement of the employments dispensed with, were included in the annual report for last year.

This change in the method of dispatching publications has not relieved the Division of Publications of any of its duties except those in connection with addressing wrappers from such mailing lists as are supplied with stencils and the labor of wrapping the publications. The maintenance of mailing lists and the writing of franks for use in responding to individual requests for publications still devolve on the Division, and the correspondence and record keeping have increased rather than decreased.

It is open to question whether the present system is entirely satisfactory. Experience has not demonstrated that it is economical, nor can it be claimed that prompt and efficient attention to individual requests for particular publications is certain under conditions which now prevail, because of the time necessarily consumed in transmitting franks to the Office of the Superintendent of Documents and the extra handling required. Frequent though unavoidable congestion in the Office of the Superintendent of Documents must necessarily add to the resulting delay. Much extra correspondence and searching of records and files is caused by addressees making complaints of failure to receive publications requested, due in many cases to this delay. As these complaints are often transmitted through the bureaus, it may readily be seen that much extra work is caused to both the bureaus and the Division of Publications by the present method of distribution. When publications were sent direct from the Department, requests were acted on and publications placed in the mails as a rule not later than the day following the receipt by the Department of the requests. This is now rarely possible. Also by reason of the familiarity of the employees of the Division of Publications with the Department's publications there was much less liability of error in

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sending the publications out. As a result, the present system is often the cause of embarrassment to the Department, especially in filling telephonic requests from Members of Congress, representatives from foreign Governments, and officials of the departments who desire copies of publications for immediate use. Under a strict construction of the law such requests can be filled only through the Government Printing Office, which is attended with more or less delay, while under the former system they could be complied with in a few minutes.

The Department is convinced that it would be wise to modify the law so far as it applies to the filling of individual requests for publications, and in such cases to allow the publications to be mailed direct from the Department. The printing bills (S. 825 and H. R. 6539) now pending in Congress will, if enacted into law, accomplish the reform desired.

The number of publications of the Department sent out on mailing lists and in response to miscellaneous requests during the fiscal year 1913 was 7,107,199, against 6,484,506 during the preceding year, an increase of 622,693, or 9.6 per cent. The following is a statement of the distribution by months:

July	574,027	February	535,435
August	623,000	March	568,999
September	584,625	April	590,911
October	627,359	May	577,876
November	552,972	June	681,087
December	584,835		
January	606,573	Total	7,107,199

TRANSFERS TO THE DEPARTMENT OF LABOR.

In compliance with the act approved May 1, 1913, making appropriations for certain expenses incident to the first session of the Sixty-third Congress, etc., the allotment to the Department for printing and binding for the fiscal year 1914 was prorated among its various offices, bureaus, and services, and $84,000 of the sum allotted was transferred on June 30, 1913, to the Department of Labor. This sum was based on the following suballotments to the several offices, bureaus, and services transferred to that Department, together with $875 for the office of the Secretary of Labor:

Bureau of Labor Statistics	$32,500
Bureau of Immigration	5,100
Division of Information	2,300
Immigration Service	18,600
Bureau of Naturalization	1,400
Naturalization Service and Naturalization Examiners	13,925
Children's Bureau	9,300
Total	83,125

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The suballotments to the bureaus, offices, and services now constituting the Department of Labor for 1913 totaled $76,750, of which only $72,375.24 was expended. The amount allotted to that Department for 1914 is therefore $7,250, or more than 9 per cent, in excess of the amount allotted to it for 1913, and $11,624.76, or more than 16 per cent, in excess of its actual expenditures in 1913, whereas the increase in the amount available for the Department of Commerce, over either allotment or expenditures (excepting, of course, the Bureau of the Census, which in 1914 for the first time is to use a considerable part of the allotment to the Department), is less than 4 per cent.

On May 15, 1913, there were transferred to the Department of Labor stocks on hand of 165 different publications, aggregating 107,710 copies, which had previously been issued by bureaus of that Department, and on May 6, 1913, there were transferred to it blank books and blank forms belonging to the Immigration Service, Naturalization Service (clerks of courts), and Naturalization Examiners Service embracing 215 different kinds, aggregating 1,156,372 copies.

SALE OF PUBLICATIONS.

Inquiries from time to time, especially by the Printing Investigation Commission, have brought to light extravagances in public printing and binding, not the least important of which is the waste in the present method of free distribution of public documents. This Department has devoted considerable thought to devising means by which such waste may be checked, and it has developed that there is only one way by which this can be done effectually, and that is by restricting gratuitous distribution, as is done by a number of foreign governments. The Department has made a few experiments in selling its publications, with uniformly satisfactory results. In one case an arrangement was entered into with the Superintendent of Documents to furnish a monthly publication of the Bureau of Foreign and Domestic Commerce to subscribers at the rate of $1 per year, and this periodical has been distributed on such a basis since May, 1913.

In each of these cases the Department has had the helpful cooperation both of the bureaus affected and of the Superintendent of Documents, and the success which has attended experiments so far has convinced the Department that they should be extended gradually to many other publications now distributed gratuitously. This conviction is based upon two very important considerations—first, the plan tends to check waste and extravagance in public printing by restricting excessive demands from sources which frequently can not be benefited by the publications; and second, and equally important, public appreciation of the work of the Depart-

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ment can not in any other way be so well gauged as by the willingness with which publications which it may issue are bought, as the Department thus has the public's estimate of the particular classes of publications which emanate from it, and consequently becomes familiar with the public's appreciation of lines of work which devolve upon it. Thus it is enabled to determine those lines to which it shall give greatest attention in developing its work.

Perhaps the Daily Consular and Trade Reports furnishes the best opportunity for the Department now to apply the subscription idea in selling its publications. The limit of 20,000 copies placed by law on the edition of these reports was reached two years ago, and although the current lists have been carefully culled there are hundreds of requests for them which can not be complied with unless Congress permits the printing of a larger edition. It has been necessary to refuse requests even from Members of Congress for copies intended for parties entitled to them. It is estimated that this publication could be supplied to subscribers for $3.50, or even $3, per year. If the recipient were required to pay such a nominal price for it, the limit on the edition would be removed, its distribution would be much more equitable than is possible under the present method, and the Department's printing and binding allotment would profit to the extent of about $40,000 per annum.

The Superintendent of Documents has ample authority to sell public documents at a price based upon the estimated cost of printing from stereotyped plates. There appears no reason why the Department should not take greater advantage of the authority thus granted to relieve its allotment for printing and binding of some of the heavy charges against it, while the sale plan would permit a wider circulation of some publications than is now permitted by the limitation placed on editions by law.

OFFICE OF THE SOLICITOR.

During the fiscal year ended June 30, 1913, 298 contracts, totaling $1,157,706, together with 68 contracts of indeterminate amount; 124 leases, amounting to $201,983; 19 revocable licenses, amounting to $5,327; insurance policies in the sum of $200,000; and 1,285 bonds, amounting to $1,690,637, were examined (approved, disapproved, drafted, redrafted, modified).

The number of legal opinions rendered, formal and informal (memorandum), totaled 336. Compensation claims handled, involving an examination as to law and facts, numbered 1,684.

In addition, 794 miscellaneous matters, embracing everything submitted for the advice or suggestion of the Solicitor, or for the formulation of departmental action, not included in the foregoing items, were handled.

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BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

In the act making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year 1913, approved August 23, 1912, Congress established the Bureau of Foreign and Domestic Commerce by consolidating the former Bureaus of Manufactures and Statistics of this Department.

Except for the addition of certain functions related to the investigation of questions arising under tariff legislation, the duties and activities of the two former bureaus were carried on during the year with little material change. The funds which had formerly been appropriated for the collection of statistics of internal commerce were not provided this year, and this made it necessary to omit these records from the Monthly Summary of Commerce and Finance. Many protests have been made by business houses interested in these statistics, and it is urged that the Bureau be again provided with means to gather and publish them. With the growth of our commerce it becomes daily more necessary to have the current statistics of our trade properly recorded in Government publications, and the extension of this particular service should receive careful consideration.

PUBLICITY WORK.

In the active development of the promotive service of the Bureau through publicity there were issued during the year its periodical bulletins of trade information, which include the Daily Consular and Trade Reports; the semiweekly press letters of statistical information; the Monthly Summary of Commerce and Finance; the monthly Sailing Dates of Steamships; the several quarterly statistical statements, and the annual volumes entitled Commerce and Navigation of the United States, Statistical Abstract, and Commercial Relations of the United States. These publications were very widely distributed and the demand for all except the last named is constantly growing. The mailing list of the Daily Consular and Trade Reports has long since reached the limit of 20,000 copies fixed by the present law, and unfilled applications have accumulated for many months. No reason for restricting the issues of this journal, it is believed, should hold against the very practical value which it possesses in relation to the extension of the export trade of the country. As a current record of commercial conditions in foreign countries it is acknowledged to be indispensable to manufacturers and exporters. The information printed in these reports is collected at very great cost, and it is

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obviously unwise to restrict unnecessarily the useful distribution of these facts to the commercial interests.

Effort is made to enhance the promotive effect of the statistical bulletins of the Bureau by analyses given to the trade press at frequent intervals. There is a great opportunity for the development of this branch of the work of the Bureau, both through improvement of methods of collecting the statistics of our commerce and by intensive studies of the use made of the published tables. Many of these tables can no doubt in this way be made more practically helpful to business men.

A large number of special commercial reports and confidential circulars were also issued during the year, and these were widely distributed direct to those firms and individuals known to be most practically interested.

Monographs on the foreign markets for motor vehicles, canned goods, musical instruments, cotton goods, shoes and leather, and many other products were published. A specially important report on Foreign Credits and a Directory of Commercial Organizations in the United States were printed, and many copies of these bulletins were sold by the Superintendent of Documents.

DIVISION OF STATISTICS.

The work of this branch of the Bureau should receive much more attention and support than is now afforded it by Congress and commercial interests. In addition to the bulletins on imports and exports, some method of collecting and publishing facts and statistics concerning the current movements of domestic commerce should be promptly established and vigorously developed if we hope to have at our command the essential facts relating to our commercial growth.

DIVISION OF FOREIGN TARIFFS.

The Division of Foreign Tariffs was largely employed during the year in aiding the Ways and Means Committee of the House of Representatives by providing information in regard to tariff matters both at home and in foreign countries. This necessarily reduced materially the volume of its work of translating and publishing the tariffs of foreign countries.

A large quantity of tariff information was, however, distributed during the year by correspondence, through the pages of the Daily Consular and Trade Reports, and by special bulletins.

FIELD INVESTIGATIONS.

A study of the publications of the Bureau will indicate the service performed by its commercial agents during the past fiscal year. As has been the policy for a number of years, special subjects have

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been taken up in turn, and studies in the United States and foreign countries have been made of the cotton-textile industry; of the trade in boots and shoes and leather, machinery and tools, drugs and proprietary medicines, canned goods, coke-oven by-products, and oil-seed products; of commercial organizations and commercial laws abroad; of trade association activities in the United States, and many similar matters.

I am convinced that this branch of the work of the Bureau should be very liberally supported by Congress. This country should be behind no other nation in the employment of expert commercial representatives, as specialists in technical commercial fields, in foreign lands. We can not expect to guard and increase our export commerce if we neglect to develop this important service, which is constantly becoming more essential in the struggle for export trade between the great competing manufacturing nations.

Pottery investigation.—The tariff legislation which occupied the attention of Congress during the year directed special attention to the Bureau as a source of useful information in regard to American manufacturing industries.

A request from the manufacturers of pottery in the United States for an intensive study of their industry resulted in a decision to make a careful survey of that subject, not as in direct relation to the pending tariff legislation but as a definite promotive contribution to the commercial history of the country. Such a study was begun in May and is now in progress. When completed it is hoped that the resultant report will be an authoritative and accurate picture of the conditions in the pottery industry, informing not only to the public and Congress but also even to those actively engaged in that industry. The work has already progressed far enough to make it seem certain that the results of the inquiry will be of great interest and of definite practical value.

The advantage of a nonpartisan and disinterested study of such a subject does not need to be pointed out at this time. Nothing is more certain than that public opinion is fixed as to the desirability of having official records of this character available, both for the promotion of commercial efficiency and for use when legislation affecting an industry is to be considered.

DEVELOPMENT AND EXPANSION OF THE BUREAU.

The matter of reorganizing the Bureau of Foreign and Domestic Commerce is of such far-reaching importance to the industry and labor of our land that it has been made the subject of special study. Our foreign commerce, to which in substance the work of the Bureau is, under present law, confined, has expanded during the past

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fiscal year at a rate in excess of $1,000,000 per day.[a] The relation of this enormous trade to the prosperity of our people is so obvious as to need no comment.

The Bureau of Foreign and Domestic Commerce, which has this work in charge, has not received the financial support to which the dignity and necessity of its work entitles it. The Chief of that Bureau receives but $4,000 per annum, while in the same Department the chiefs of other bureaus, no more closely related to our welfare, are paid one-half more. The total appropriation, including printing and contingent allotments, is less than $364,000, which is trivial in comparison with the duties to be performed and the opportunities to be opened.

Being familiar, in a general way, with the operations of this Bureau before assuming office, I gave the subject of its reorganization careful thought for some weeks after it came under my charge as Secretary of Commerce. I then requested the Chief of the Bureau to prepare a written statement of what, in his judgment, should be done to develop the work under his care. When this was done and statements from other departmental sources on the same subject were prepared, I requested a committee of experienced officers in my own Office to go over these papers and to submit a plan for reorganization based upon the facts thus laid before them and on their own experience. This plan I have myself carefully revised, in consultation with the said committee, and it is presented below.

The proposed organization, consisting of five units, divides the work of the Bureau into four classes, namely, (1) promotion work under the immediate supervision of the Chief, (2) collection of information, (3) distribution of information, and (4) administration. This plan provides for a Chief and two Assistant Chiefs. One of the Assistant Chiefs should be placed in charge of investigations to be made under the law which transfers to the Bureau certain duties formerly under the present Bureau of Labor Statistics of the Department of Labor, and of a section dealing with tariffs and tariff relations; the other should be in charge of that part of the work which relates to the collection and compilation of statistics, the work performed by commercial attachés, commercial agents, and consuls, in so far as the work of the latter relates to the Department of Commerce.

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[a] Imports:

1913	$1,813,008,234	
1912	1,653,264,934	
Increase in imports, 1913 over 1912		$159,743,300
Exports:		
1913	2,465,884,149	
1912	2,204,322,409	
Increase in exports, 1913 over 1912		261,561,740
Increase in total trade, 1913 over 1912		421,305,040

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DIVISION OF THE WORK.

(1) *Promotion work.*—This work should be such as may be assigned to the Chief of the Bureau by the head of the Department in connection with commercial and trade organizations of all kinds, and such other trade-promotion work for which Congress may hereafter provide.

(2) *Collection of information.*—Under this head should be placed the work having to do with investigations made in connection with the duties transferred to the Bureau by recent law, tariff work, statistical work, and the work of commercial attachés, commercial agents, and consuls. This work should be organized under two Assistant Chiefs, one to be in charge of the investigation and tariff work referred to, the other to be in charge of the other classes of work under this group, viz, statistics, commercial attachés, commercial agents, and consuls.

(3) *Distribution of information.*—The work of distribution of information under the proposed plan should be placed in charge of a division to be called the division of commercial reports, the chief of which should come under the immediate supervision of the Chief of the Bureau. This division should have entire charge of the method of presentation of all information collected by the Bureau; the preparation of monographs on special subjects; the editing, revising, and issuing of publications, and the answering of all inquiries for information pertaining to the work of the Bureau.

(4) *Administration.*—The administration should be under a chief clerk, who should be charged with the detail of handling the general administrative affairs of the Bureau.

PERSONNEL AND DUTIES OF THE VARIOUS ORGANIZATION UNITS.

The duties of the Chief of the Bureau shall be such as are required by law and directed by the head of the Department, and which usually pertain to the administration of a Federal bureau. It shall be his duty to foster and promote American commerce and trade, and to make known the duties and operations of the Bureau of Foreign and Domestic Commerce, along the line of trade promotion, by personal conferences with trade organizations, and trade bodies organized for the purpose of promoting the commerce of the United States both at home and abroad. He is, under the suggested arrangement, provided with a private secretary and 2 clerks, making a total personnel of 4 for his immediate office.

The Assistant Chief in charge of investigations and of the section dealing with tariffs and tariff relations should be a lawyer, versed in economics and statistics. He should have in his immediate office 3 clerks, making a total personnel of 4. Congress has been asked for a lump-sum appropriation of $100,000 for the fiscal year ending June 30, 1915, for the employment of experts and field agents for the pur-

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pose of making the investigations required under the act of August 23, 1912. An appropriation of $50,000 for this purpose was made in the urgent deficiency bill approved October 22, 1913, for the fiscal year ending June 30, 1914.

The tariff section should be provided with a chief and a clerical force of 8 assistants, ranging in salaries from $1,000 to $2,000, making a total personnel for this section of 9.

The other Assistant Chief provided in the organization plan, to be in charge of the statistical division, the force of commercial attachés, commercial agents, and work of the consuls pertaining to the Department of Commerce, should have in his immediate office 3 clerks, making a personnel of 4. He should have under him a chief statistician to be directly in charge of the statistical work of the Bureau. The duties of this division should pertain entirely to the tabulation and compilation of statistics pertaining to our foreign trade. These statistics are furnished the Bureau on specially prepared forms. The duties of the division should be merely those of tabulation and compilation without any duties involving the publication or presentation of facts.

The statistical division should be provided with 44 clerks, with salaries ranging from $900 to $2,000 per annum. It is my opinion that the present divisions in the Bureau dealing with statistics, viz, compilation and revision, should be consolidated into one division, thus making the entire personnel of this enlarged statistical division interchangeable for all purposes of compilation and final checking of figures. It is believed that the force thus provided for this division will be ample to take care of the work until such time as import and export statistics are considerably enlarged. It may also care for statistics of domestic trade when this work is authorized.

I am informed that there are about two and one-half times as many employees now engaged upon similar work in Canada as in the United States, and that the volume of foreign trade in the United States is nearly five times greater than that of Canada; but I believe that with a proper reorganization of the statistical division of the Bureau satisfactory results may be obtained, for the present, with the personnel recommended.

The division of commercial reports should be charged with the duty of distributing all information collected and collated by the Bureau. The chief of this division should come immediately under the Chief of the Bureau. All materials collected, collated, and compiled in the various divisions of the Bureau should be forwarded to this division, which, under the supervision of the Chief of the Bureau, should devise the method of presenting the information to the public. The division should determine, subject to the direction of the Chief of the Bureau, whether certain information should be published, the form in which it should be published, etc. In this

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division should be prepared such monographs on particular topics as it is decided to issue, all replies to inquiries for information on the Bureau, whether made by Congress, the departments, or private individuals, the editing, revising, and proof reading of all publications, and the preparation of matter for the press. It should be supplied with a force of 21 employees, whose salaries should range from $900 to $2,500 per annum, making a total personnel of 22 for this division.

The chief clerk should have supervision over the administration of the clerical force of the Bureau and its distribution. He should be in charge of the property and quarters of the Bureau, records relating to leave of absence, accounting, bookkeeping, etc. He should be provided with 3 clerks, 3 assistant messengers, and 2 laborers, making a total personnel of 9.

The following table shows the proposed organization by organization units, together with the salaries for each position:

Position.	Salary.	Position.	Salary.
Chief of Bureau	$7,500	Chief of Bureau—Continued.	
Private secretary	1,800	2. Assistant Chief—Continued.	
1 clerk, class 3	1,600	*a.* Chief statistician—Continued.	
1 clerk, class 2	1,400	10 clerks, at $1,000 each	$10,000
a. Promotion (lump-sum appropriation, $100,000).		10 clerks, at $900 each	9,000
1. Assistant Chief	4,000	(Total for division, 45 employees.)	
Confidential clerk	1,600	*b.* (Commercial attachés, $150,000 appropriation.)	
2 clerks, class 1	2,400	*c.* (Commercial agents, $100,000 appropriation.)	
(Lump-sum appropriation, $100,000.)		*d.* Consuls (for commercial reports).	
Chief of division of tariff and tariff relations	3,000	3. Chief of division of commercial reports	3,000
1 translator	2,000	Assistant chief	2,500
1 clerk, class 4	1,800	2 clerks, class 4	3,600
2 tariff assistants, at $1,400 each	2,800	2 clerks, class 3	3,200
1 clerk, translator	1,400	3 clerks, class 2	4,200
1 clerk, stenographer and typewriter	1,400	4 clerks, class 1	4,800
1 clerk, translator	1,200	4 clerks, $1,000 each	4,000
1 clerk	1,000	5 clerks, $900 each	4,500
(Total for division, 9 employees.)		(Total for division, 22 employees.)	
2. Assistant Chief	4,000	4. Chief clerk	2,250
Confidential clerk	1,600	1 clerk, class 4	1,800
2 clerks, class 4	3,600	2 clerks, class 2	2,800
a. Chief statistician	3,000	3 assistant messengers, $720 each	2,160
1 clerk	1,500	2 laborers, $660 each	1,320
Chief of division	2,000	(Total for office, 9 employees.)	
5 clerks, class 4	9,000		
5 clerks, class 3	8,000		
5 clerks, class 2	7,000	Total	142,130
7 clerks, class 1	8,400		

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The following table shows, in parallel columns, the proposed and present organization of the Bureau:

Proposed organization.				Present organization.			
Position.	No.	Salary.	Total.	Position.	No.	Salary.	Total.
Chief of Bureau	1	.....	$7,500	Chief of Bureau	1	.....	$4,000
Assistant Chiefs	2	$4,000	8,000	Assistant Chief	1	.....	3,000
				Assistant Chief	1	.....	2,750
Chief statistician	1	.....	3,000				
Chiefs of division	2	3,000	6,000	Chief of division	1	.....	2,500
Chief of division	1	.....	2,000	Chief of division	1	.....	a 2,500
Assistant chief of division	1	.....	2,500	Assistant chief of division	1	.....	a 2,000
Chief clerk	1	.....	2,250	Chief clerk	1	.....	2,250
Translator	1	.....	2,000				
Private secretary	1	.....	1,800	Stenographer to Chief of Bureau.	1	.....	1,600
Confidential clerks	2	1,600	3,200				
Clerks of class 4	11	1,800	19,800	Clerks of class 4	7	$1,800	12,600
Clerks of class 3	8	1,600	12,800	Clerks of class 3	5	1,600	8,000
Clerk	1	.....	1,500	Clerk	1	.....	1,500
Clerks of class 2	15	1,400	21,000	Clerks of class 2	11	1,400	15,400
				Tariff assistant	1	.....	a 1,440
				Translator	1	.....	a 1,400
				Clerk	1	.....	a 1,400
Clerks of class 1	14	1,200	16,800	Clerks of class 1	14	1,200	16,800
				Translator	1	.....	a 1,200
Clerks	15	1,000	15,000	Clerks	17	1,000	17,000
Clerks	15	900	13,500	Clerks	11	900	9,900
				Messenger	1	.....	840
Assistant messengers	3	720	2,160	Assistant messengers	5	720	3,600
Laborers	2	660	1,320	Laborers	4	660	2,640
				Laborer	1	.....	480
Total	97	.....	142,130	Total	89	.....	114,800

a The salaries for these positions are paid from the appropriation for collating tariffs of foreign countries.

The comparative table shows an increase in salaries of $27,330, with an increase of only 8 in the number of positions provided for.

SUGGESTED LEGISLATION FOR NEW WORK.

Commercial attachés.—It is believed that Congress should authorize the employment by the Department of 14 commercial attachés, to be resident in various foreign countries, these attachés to be each supplied with a clerk whose compensation should be $1,500 per annum. The attachés should be divided into three groups as regards salaries, viz, 3 at $5,000 per annum, 4 at $4,500 per annum, and 7 at $4,000 per annum. The countries to which these attachés should be accredited, and their headquarters, are given in the table on the following page, which also gives the total area of the countries represented, population, and total trade with the United States in 1912.

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The attachés should be men of demonstrated commercial ability and experience, speaking the language of the country to which they are accredited or a language current in commercial circles therein. Preference would be given officers of the Consular Service and the Department of Commerce or other branches of the executive service who have unblemished records and who have shown marked ability in commercial promotion.

SUGGESTED ORGANIZATION OF A CORPS OF COMMERCIAL ATTACHÉS SHOWING TERRITORY TO BE COVERED BY EACH ATTACHÉ, SALARY, HEADQUARTERS, AREA, POPULATION, AND TRADE WITH THE UNITED STATES IN THE FISCAL YEAR 1913.

District.	Salary.	Headquarters.	Area.	Population.	Imports into United States.	Exports from United States.
			Sq. miles.	*Number.*		
United Kingdom.....	$5,000	London.....	121,316	45,366,000	$295,564,940	$597,149,089
Germany, Denmark, and Switzerland (possibly Scandinavia).[a]	5,000	Berlin.....	538,929	79,650,000	234,790,699	371,694,879
France, Belgium, and Netherlands.	5,000	Paris.....	231,673	53,114,000	216,999,971	338,855,525
Austria-Hungary, Greece, Balkan States (possibly Turkey).[b]	4,500	Vienna.....	500,224	76,770,000	33,773,531	29,282,920
Argentina, Paraguay, and Uruguay.	4,500	Buenos Aires....	1,309,000	9,150,000	29,372,714	60,604,846
Japan and Chosen [c]...	4,500	Tokyo.....	245,641	68,997,000	91,638,373	59,112,741
China [d].....	4,500	Peking.....	4,277,170	336,042,000	39,010,800	21,326,334
Peru, Bolivia, and Ecuador.	4,000	Lima.....	1,510,143	8,378,000	12,704,618	10,336,433
Russia [e].....	4,000	St. Petersburg..	8,361,708	166,108,000	29,315,217	26,465,214
Brazil.....	4,000	Rio de Janeiro..	3,291,416	21,115,000	120,155,855	42,638,467
Chile.....	4,000	Santiago.....	292,420	3,415,000	27,655,420	16,076,763
Italy and Mediterranean countries.[f]	4,000	Rome.....	1,744,000	92,369,000	109,689,965	111,642,963
British South and Central Africa.[g]	4,000	Johannesburg...	2,283,478	35,961,000	4,334,339	18,352,009
Australia, New Zealand, South Pacific Islands.[h]	4,000	Melbourne.....	3,079,332	5,665,000	15,341,362	52,431,352

[a] Includes Germany, Switzerland, Denmark, Norway, and Sweden.

[b] Includes Austria-Hungary, Roumania, Bulgaria, Servia, Montenegro, European Turkey, and Greece.

[c] Does not include, as regards area and population, Sakhalin, but for commerce the figures include the southern part of that island. Formosa is included throughout.

[d] Does not include leased territory.

[e] European and Asiatic.

[f] Includes Italy, Spain, Gibraltar, Malta and Gozo, Asiatic Turkey, Egypt, Tripoli, and Morocco.

[g] Includes all British Africa. Central Africa not separately stated.

[h] Includes only Australia and New Zealand. Area and population of the Southern Pacific Islands can not be separately stated. United States commerce with German, French, and British Oceania, exclusive of Australia and New Zealand: Imports, $1,191,831; exports, $1,286,700.

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The commercial attachés provided for in the organization plan should be officers of the Department of Commerce, who should, however, through the State Department, be accredited to the various foreign embassies and missions in the same manner as naval and military attachés are now accredited. They should establish headquarters where they will always be represented by a clerk, provided in the plan of organization. Their duties should be to collect information which will prove of value to American manufacturers and business concerns. It is suggested that commercial attachés receive appointments of comparatively long terms, as their value to the Government will depend entirely upon their knowledge, through experience, of local conditions in the countries to which they are accredited. They should be excepted from the requirements of competitive civil-service examinations and should be appointed by the Secretary of Commerce. The law should be so framed that the head of the Department of Commerce, through the bureau, can correspond directly with the commercial attachés, and not be required to use any agencies of the State Department for that purpose.

For this work I have recommended that Congress appropriate a lump sum of $150,000 for 1915. Of this appropriation, under the above plan, $82,000 would be for salaries of the commercial attachés and their clerks, while $68,000 would cover traveling and subsistence expenses, rent of quarters, and all other miscellaneous items in connection with their work, including their transportation from Washington to their stations and return. A draft of the suggested appropriation to cover these items is given below:

COMMERCIAL ATTACHÉS: For commercial attachés to be appointed by the Secretary of Commerce without examination under the civil-service rules, and to be accredited through the State Department, whose duties shall be to investigate and report upon such conditions in the manufacturing industries and trade of foreign countries as may be of interest to the United States, as follows: 3 at $5,000 each; 4 at $4,500 each; and 7 at $4,000 each; and for 1 clerk to each of said commercial attachés to be paid a salary not to exceed $1,500 each, and for necessary traveling and subsistence expenses, rent, purchase of reports, travel to and from the United States, and all other necessary expenses not included in the foregoing, $150,000: *Provided*, That the commercial attachés shall serve directly under the Secretary of Commerce and shall report directly to him.

Commercial agents.—The force of commercial agents should also come under the immediate direction of an Assistant Chief, whose duties relative to this force should consist largely of advising them as to the class and kind of information that is desired (supervision of the field work), leaving the entire work incident to methods of presentation and issuing of reports to the division of commercial reports. For the commercial agents it is recommended that an

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appropriation of $100,000 be made, to be worded as given in the following form:

To further promote and develop the foreign and domestic commerce of the United States, to be expended under the direction of the Secretary of Commerce, $100,000: *Provided*, That the consular officers of the State Department shall report directly to the Secretary of Commerce with reference to commercial matters: *Provided, also*, That not exceeding $3,000 out of the sum hereby appropriated may be expended for the purchase of documents, manuscripts, plans, specifications, and other publications necessary for the promotion of our commercial interests.

Consuls.—The duty of the Assistant Chief in relation to consuls should be that of preparing all calls for commercial information upon a given subject, the direction of the class of general information to be supplied, leaving all questions of methods of presentation, editing, and elimination to the division of commercial reports. It is recommended that the gathering of purely commercial information and the furnishing of commercial data by consuls be under the general supervision of the Secretary of Commerce, while retaining the appointment and control of the consuls under the Department of State, as at present, and appropriate legislation to effect that purpose is recommended in the estimate of appropriations for commercial agents for this Department.

The direct transmission by consular officers of reports relative to the work they, under the law, are required to perform for the Department of Commerce seems to be a more businesslike and efficient procedure than the practice under current law.

Developing trade in Central and South America.—It is believed that the Bureau should be provided with a special lump-sum appropriation of $100,000 with which to develop the trade of the United States with Central and South America.

The completion of the Panama Canal will greatly facilitate communication between the United States and the vast territory comprising Central and South America, and a special effort should be made by this country to develop its full share of this trade. The following form is suggested for the appropriation:

To further promote and develop the commerce of the United States with South and Central America, including the employment of experts and special agents in Washington, D. C., and elsewhere, purchase of books of reference, reports, traveling and subsistence expenses of officers and employees, and all other necessary incidental expenses not included in the foregoing, to be expended under the direction of the Secretary of Commerce, $100,000.

Investigation of costs of production.—In the estimates for the fiscal year 1915 an estimate for an appropriation of $100,000 is made to enable the Department to execute the provisions of law directing investigations into costs of production and other economic conditions

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affecting manufacture and trade. Using the language of the law as now on the statute books for a basis, the appropriation should be in the following form:

For salaries and all other actual necessary expenses, including field investigations at home and abroad, compensation of experts and special agents, to be employed in Washington, D. C., or in the field, without examination under the civil-service rules, rental of quarters in Washington, D. C., and elsewhere, purchase of books of reference and manuscripts, to enable the Bureau of Foreign and Domestic Commerce of the Department of Commerce to ascertain at as early a date as possible, and whenever industrial changes shall make it essential, the cost of producing articles at the time dutiable in the United States, in leading countries where such articles are produced, by fully specified units of production, and under a classification showing the different elements of cost, or approximate cost, of such articles of production, including the wages paid in such industries per day, week, month, or year, or by the piece; and hours employed per day; and the profits of manufacturers and producers of such articles; and the comparative cost of living, and the kind of living; what articles are controlled by trusts or other combinations of capital, business operations, or labor, and what effect said trusts or other combinations of capital, business operations, or labor have on production and prices, $100,000.

This appropriation will provide a corps of experts and special agents who will make the investigations and reports required.

The following table shows the estimated appropriations which will be required if the recommendations in this report are enacted into law, compared with the appropriations for the Bureau for the present fiscal year, under current law:

Items.	Appropriation suggested for the organized Bureau.	Appropriation for 1914 under current law.
Salaries for Bureau	$142,130	$104,860
Promoting commerce (commercial agents)	100,000	60,000
Collating tariffs	.....	10,000
		174,860
Investigation work under law transferred from Bureau of Labor Statistics	100,000	50,000
Commercial attachés	150,000	.....
Promotion work in Central and South America	100,000	.....
	592,130	224,860
Printing and binding (suballotment from Department allotment)	160,000	135,000
Contingent expenses (allotment from Department appropriation)	7,500	3,500
Total	759,630	363,360

The sum of approximately $760,000, suggested as necessary for the proper work of this Bureau, is less than two-hundredths of 1 per cent of the commerce passing under the review of this Bureau during the last year.

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Possibly I may have erred in not asking a more adequate provision for this great work. Certainly it is not consistent with our national self-respect to ask for less. It should be noted, finally, that now is the appointed time. We have spent several hundred millions preparing the Panama Canal and the nations of the world have been getting ready for its use while we have done almost nothing actively to promote the commerce which should repay the nation, in part at least, for this vast outlay.

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BUREAU OF CORPORATIONS.

SCOPE OF PAST WORK.

Heretofore specific industries, such as beef, oil, tobacco, lumber, steel, water transportation, water power, harvester, and cotton exchanges, have been the subject of investigation by the Bureau of Corporations. They have been isolated, intensive investigations, each conducted without reference to the plan of the other, except as general conditions demanded. Their value has been immediate and local in the sense that they have each been confined to one specific subject.

STATUS OF PENDING INVESTIGATIONS.

Of these old investigations those on lumber, tobacco, water transportation, the harvester industry, and corporate taxation remain to be concluded by the publication of additional reports, but all of them will probably be closed up within the next 12 months. In addition to these are the new investigations now pending pursuant to Senate resolutions, to wit, investigations of the fertilizer industry, the relationship of the Oklahoma oil fields to the general oil market, and the cotton pool. The two former are broad subjects, and will require considerable time for their investigation and report thereon.

The following additional investigations are being pursued at the present time:

Administrative commissions.—A comparative analysis of the laws of foreign countries and of the various States creating administrative commissions is now under way. A comprehensive understanding of what other governments have done, what weaknesses have developed, and what attributes are essential in the formation of administrative commissions will undoubtedly be of assistance in future legislation.

Conflict of State laws relating to foreign corporations.—Each Commonwealth of the Union has its distinctive laws with reference to corporations foreign to its jurisdiction. This has resulted in a wide divergence in the prerequisites for doing business in the various States with respect to interstate corporations. The penalties imposed for technical failure to comply with such prerequisites are in many instances drastic and severe. This condition has often seriously hampered and restricted the business world. It has neces-

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sitated the retention by practically every large concern engaged in interstate commerce of an attorney who devotes himself to a study of the laws of the various States, so as to preserve the rights of lien and other contract rights of the particular corporation in its interstate activities. The amount of money actually lost by corporations due to unknowing violations of the laws of different States is undoubtedly very large. The Bureau proposes, therefore, to make an exhaustive study of the laws of the various States on this subject and to prepare a model system of regulation of foreign corporations, with a view to cooperating with State legislative committees in the modification of their laws. It is believed that if, as a result of this investigation, the Department is able to advise corporations doing an interstate business that at least in a number of States (naming them) a uniform system of regulation of foreign corporations has been established, a great and constructive piece of work will have been done for the benefit not only of the business world but of the respective communities as well.

Trade agreements.—An investigation of trade agreements is also in progress, with a view to establishing some facts as to what agreements, if any, apparently in restraint of trade, are really in aid of competition and should be exempted from the operation of the Sherman Act.

Fixed price for resale of articles.—There is also the investigation now pending with reference to the merits and demerits of a condition which prohibits a uniform price from being fixed by manufacturers and jobbers, binding upon retailers, as to articles of their manufacture.

Foreign laws on trusts, cartels, etc.—A comparative study and analysis of the laws of foreign countries with reference to the regulation by government of trusts, monopolies, cartels, etc., is now being made. Such a study of the laws of England, Germany, France, Canada, Australia, and New Zealand, and an authoritative statement of what they are, should prove of value.

FUTURE WORK.

The organic law of the Bureau provides:

> The said Commissioner shall have power and authority to make, under the direction and control of the Secretary of Commerce, * * * diligent investigation into the organization, conduct, and management of the business of any corporation, joint stock company or corporate combination engaged in commerce among the several States and with foreign nations excepting common carriers * * * and to gather such information and data as will enable the President of the United States to make recommendations to Congress for legislation for the regulation of such commerce.

In order to accomplish the said purposes, the Commissioner is given power to procure testimony and facts by subpoena, including

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the power to compel the production of books, papers, etc. It is therefore within the power of the Bureau of Corporations—indeed, it might be stated that it is the duty of the Bureau of Corporations—to gather information of a broader and more comprehensive character with reference to industrial conditions pertaining to interstate commerce, so far as they have to do with corporations, than would be entailed in the investigation of isolated industries.

To be sure, the character and nature of the work of the Bureau of Corporations will be dependent upon the outcome of congressional action at the ensuing session of Congress, which will doubtless legislate with reference to the trust problem; and practically all of the bills submitted regarding this matter contain some reference to certain activities to which the Bureau may address itself, either as a part of the action of a commission or independent thereof.

There are two matters which ought to be handled by some governmental agency—the one is immediate and administrative; the other is fundamental and economic—and it lies within the power of the Bureau of Corporations to do this work under the present status of the law.

(1) *Reports of corporations.*—There are constant demands upon the Bureau for information with reference to certain particular corporations, which should be a matter of public information, but which it is unable to give at the present time. Some governmental agency should be clothed with the power and the duty to obtain and preserve as a public record facts with reference to interstate corporations, especially with respect to the larger companies. Where size limitations have been fixed, a gross business of $5,000,000 has been generally accepted as the minimum standard in practically all bills introduced and pending in Congress, but certain facts should be required from smaller concerns in order to determine, among other things, the degree of control which large corporations possess in any particular branch of industry. These facts could be obtained by schedules to be prepared by the Bureau and submitted to corporations to be filled out and returned. The information sought might include copies of charters and by-laws; names of directors and officers; kinds and amounts of capital stock, bonds, and other similar obligations; statements of assets and liabilities and of profit and loss, or income; dividends, both cash and stock; the names of other corporations in which it holds stock, and names of other corporations which hold its stock, and the respective amounts held; other companies in which its officers or directors are either officers or directors, and their stockholdings in such other companies; agreements made with other corporations engaged in a similar or related business with respect to control of markets or territory, price fixing, etc. Such returns should be made annually, and in connection with the first annual return additional

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information regarding the original organization and capitalization of the corporation would probably be desirable, together with the stock or other consideration paid to promoters or underwriters. The careful analysis and coordination of this mass of information would shed a degree of light upon conditions that would be of great value to the President and to the country in considering the problem of control. This work would probably require a force equal to the present force of the Bureau.

(2) *Fundamental and economic question: The efficiency of trusts.*—That there are immediate and well-known conditions that should and can be remedied by law is apparent. Some of these remedies are, for instance, a law providing that there shall be a presumption that all restraints of trade are unreasonable, and placing the burden of establishing the reasonableness of such restraint upon the party alleging it; legislation looking to fundamental charter provisions for every corporation doing interstate business, that stocks and bonds shall not be issued except for money or property at its true money value, preventing the watering of stocks; that corporations shall not hold stock in other competing companies, and that neither a person nor a corporation shall at the same time own a controlling interest in two or more competing corporations, or that the officers of corporations shall not be affiliated directly or indirectly by holding office in other corporations.

Congress will undoubtedly address itself to some of these aspects of the situation with curative provisions. Regardless of such legislation, however, there still remains a fundamental economic fact to be determined, to wit, whether the trust or monopolistic form is socially and economically efficient in production, as is alleged; and upon the solution of this problem must depend the ultimate attitude of government toward combinations and consolidations in business. It is contended by some that with the increase in the size of industrial enterprises there goes a reduction in the cost of extraction, manufacture, and distribution, and that such reduction in cost is accompanied by lower prices to the consumer and does not involve a reduction in wages or an impairment of the conditions of labor. Even if these conditions were true, the question would still remain, of course, whether the evil resulting from large combinations would not be greater than the alleged advantages of cheaper production. It is contended, on the other hand, that the source and origin of monopoly is found chiefly in the desire to exploit the general public by stock-jobbing schemes for the immediate profit of the promoters or in the purpose to attain control of the market and exact unduly high prices from the consumer. Many large combinations have failed and demonstrated their economic inefficiency. Combinations which have attained control of the market, it is admitted, have prospered, but this

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may be due to monopolistic position rather than to superior efficiency. According to this view, there is a point beyond which increase in size does not result in increase in efficiency, but rather in loss and waste, so that the maximum efficiency is not attained by large combinations, but by concerns of moderate size. If the latter contention be true, then, as has been said, the monopolistic system contains in itself the seeds of its own decay, and the proper attitude of government must be regulation of competitive conditions and not regulation of monopolistic factors.

No governmental agency is engaged in the attempt to secure facts in a scientific manner directed to this problem. The problem perhaps can not be solved dogmatically; but a careful, painstaking investigation would undoubtedly bring a great volume of facts, an analysis and study of which could not but throw great light upon the question.

Here, then, are two functions which the Bureau of Corporations could perform, conditioned, of course, upon its being furnished with the necessary appropriation.

In connection with this matter, permit me to call your attention to a practice which has grown up whereunder certain matters are referred by congressional resolution to the Bureau of Corporations for investigation. By this avenue there have come to the Bureau in the past investigations which in themselves would consume the Bureau's entire appropriation. These investigations are all of immediate importance, but for the greater part are of local rather than general interest. The Bureau of Corporations is desirous of performing this very useful function, and is splendidly equipped so to do; but to pursue investigations of this character would necessarily absorb the entire resources at its command, with the result that a constructive policy along a definite line would be impossible. It is therefore strongly urged that resolutions of this kind directed to the Bureau of Corporations contain appropriations for such investigations.

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BUREAU OF STANDARDS.

The past fiscal year has been the most active one in the Bureau's history. In addition to its regular activities in testing and research, several new lines have been developed, the new electrical building has been completed, additional land has been purchased, numerous technical conferences have been held, and a sharp increase has occurred in the demands for the Bureau's cooperation in connection with public-utilities regulation. In spite of the technical character of the Bureau's work, its direct and intimate relation to the interests of the general public have given it opportunities for usefulness of unusual promise. Notable among its lines of work have been the success in its movement for honest weights and measures in daily trade, its cooperation in the more precise application of temperature control in the industries, its completion of fundamental work on electrical standards, the development of optical work, particularly with regard to photometric and color standards, and progress made toward establishing standards of quality for materials, and standards of regulation affecting public utilities. As a testing laboratory for the Government service, the Bureau has given assistance to various departments and independent establishments in the purchase of supplies by specification and test.

The appropriations for the year provided for the purchase of about 8 acres of land adjoining the present site, for the completion of the new electrical laboratory, for the completion of the large tension-compression testing machine, and for several special investigations, including the determination of refrigeration constants, the investigation of the effects of electric currents, and work on structural materials.

The testing of standards, weights, and measures, measuring instruments, and materials has been continued along with the research work in the various divisions and included 63,365 distinct tests. In addition, about 25,000 spring scales were critically examined at the factories for the parcel-post service, about 16,000 samples of cement were tested for the Isthmian Canal Commission and others, and about a million and a quarter incandescent electric lamps furnished on Government contracts were inspected. Approximately one-fourth of the laboratory tests made at the Bureau were for the public. These comprised standards and measuring instruments for heat, light, electricity, length, mass, capacity, pressure, and others. Since the

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testing of materials is not done for the public except under certain conditions, the Bureau's work on materials is the development of standards of quality and methods of testing, and in this manner it renders important service to industrial testing laboratories.

However important the testing—and its importance is being increasingly recognized—the Bureau's investigations into technical problems of standards, methods of measurement, tolerances, measuring instruments, legislation and regulation, and the standards of quality of materials must be recognized as of the utmost importance. The Bureau is not only called upon by all departments of the Government but by public-service commissions of cities and States, by State and municipal governments, manufacturers, and public-utilities companies, for experimental and other research for which the Bureau is peculiarly well fitted and for data which is in many cases at hand. The work of the Bureau of Standards in aiding the States and cities in formulating the scientific and technical details of legislation has been particularly appreciated and its services have been in constant demand for this purpose. In this work the Bureau serves in a purely advisory and cooperative capacity, but it is believed that its work has been none the less effective, since its decisions have been arrived at through unbiased laboratory and field investigations by competent specialists.

WORK FOR MUNICIPALITIES AND STATES.

One of the most widely felt needs among the States and municipalities was for a uniform weights and measures law. Such a model law was prepared through the efforts of the Bureau and has been approved by the sixth weights and measures conference at the Bureau and is under consideration in numerous States. While ideal uniformity is not to be expected, the results are gratifying. Among the States which have requested and received the aid of the Bureau in this respect are California, Illinois, Indiana, Iowa, Kansas, Michigan, New Hampshire, Pennsylvania, and Texas. As far as local conditions permitted the provisions of the model law were adopted.

Another example of cooperation in the technical details of legislation is furnished by the model laws and regulations prepared by the Bureau on the subject of illuminating gas. These were the outcome of comprehensive investigations in the laboratory and in the field on the standardization of the manufacture, distribution, and use of gas, and embody the results of the best experience. In this work the Bureau has had the valuable cooperation of gas experts in all parts of the country. The Bureau's model regulations now form the basis of advanced legislation upon the subject of illuminating gas. These standard regulations have been published by the Bureau and will be revised from time to time as technical progress requires.

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Among the subjects studied were measurements of purity, heating value, candlepower, and the pressure of the gas—all important factors in an efficient gas service. This is a type of work which must be done in connection with all kinds of public utilities, the regulation of which is rapidly passing from legislative bodies to public-service commissions.

An investigation of great interest to cities is the recently completed study of the effects of electric currents upon underground structures such as gas and water pipes, reenforced concrete foundations of buildings and bridges, and other underground structures. In such cities as St. Louis, Chicago, and Philadelphia the electrolysis problem is a serious one. The Bureau's work, which will soon be published, resulted in a model survey which may be applied to cities and in a compilation of the means by which the effects of such currents may be minimized or entirely avoided.

Other examples of the technical service rendered cities might be cited, such as the investigation of the photometry of street lamps for the cities of Washington and Philadelphia, which proved of particular service to these cities and resulted in greatly improved service.

With the rapid increase in the number of State and municipal public-service commissions, the variety of technical problems which arise in connection with the regulation of public utilities will increase accordingly. The Bureau has demands for its cooperation in an advisory capacity and much technical work has been done for these commissions. The importance of such work and the high class of experts required necessitate a special provision for it.

WEIGHTS AND MEASURES OF COMMERCE AND TRADE.

Among the important events of the year has been the Eighth Annual Conference on Weights and Measures, held at the Bureau of Standards in May. Twenty-five States, twenty-nine cities, a number of railroad scale inspectors, and manufacturers of weighing and measuring apparatus were in attendance. Through these conferences the Bureau exerts a far-reaching influence toward uniformity of practice and regulation in the local inspection service in the States and cities, with the most favorable effect upon the weights and measures of daily trade.

In cooperation with local inspection service of States and cities, the Bureau will supplement the local facilities by taking up the testing of large scales, such as warehouse and railroad scales, for which the equipment of local sealers is inadequate. This work is particularly imperative in the testing of the large scales used in the interstate shipments of commodities where both Federal and State governments will cooperate. The Bureau has contracted for a test car,

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the construction and equipment of which is a distinct improvement in type and will mark an important step forward in such work. The railroad, elevator, and other scales used in weighing commodities for interstate shipment will, it is hoped, be placed on a basis where both shippers and railroads may have confidence in freight weighings involving approximately $2,200,000,000 annually.

The data from this investigation of large scales will facilitate the design and construction by manufacturers of such scales as will embody the best engineering features in accord with the carefully worked out theory of the operation of such apparatus. Several technical papers upon the theory and design of scales were prepared for the eighth annual conference. A study of the entire situation has brought out forcibly the defects in construction, testing, and maintenance of such scales. In this connection may be mentioned the assistance to the Post Office Department in establishing the parcel-post service scales upon an efficient basis. The Bureau aided in preparing the specifications and tolerances, and examined critically the many models submitted to obtain the best scale for the purpose of quick and accurate weighings. The Bureau tested and inspected many thousands of the scales at the factories. The results of these tests proved the necessity of the most careful inspection of measuring and weighing apparatus, even when submitted on carefully drawn specifications. Many thousands of seriously faulty scales were rejected.

ESTABLISHMENT OF STANDARDS.

The Bureau is cooperating with the national standardizing laboratories of England, Germany, and France, with a view to international agreement on the standard temperature scales used by the several institutions, and there is excellent prospect for satisfactory agreement. Much information was furnished to a number of laboratories, both industrial and in the Government departments, on specifications for high-grade mercurial thermometers and on complete temperature equipments for scientific work requiring the highest accuracy. By this work the Bureau is establishing throughout the country the standard scale of temperature, an essential factor in all industries involving temperature measurements.

Standards of color are urgently needed for grading commodities, since many articles are purchased upon color specifications. For example, cottonseed oil is commercially graded according to color, the color being a factor in fixing the price. Disputes between buyer and seller, involving thousands of dollars, arise from diverse methods of testing color. The Bureau was appealed to in the matter by the Society of Cotton Products Analysts, and in cooperation with that society and with the New York Cotton Exchange, the Bureau has

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undertaken to establish standards of color and standard methods of color testing.

The Bureau investigated experimentally the basis of standardization used in polarimetry of sugars and found that the 100-degree (or 100 per cent pure) point was in error by being placed one-tenth of 1 per cent too high. As a result of the Bureau's work, the International Sugar Commission has appointed a committee, representing the Bureau of Standards, the Austrian Sugar Institute, the German Sugar Institute, and the Physikalisch-Technische Reichsanstalt, to make proper recommendations. As all transactions in sugar the world over are made upon the basis of the polarimeter readings, the importance of a precise value of the 100-degree point is self-evident.

The urgency of establishing refractive index standards arises from the rapidly increasing use of the refractometer as a means of accurately detecting impurities in liquids. In radiometry, the Bureau has established a standard of radiation and now issues radiation standards in the form of electric incandescent lamps, calibrated so as to give in absolute units the energy radiated from the lamp. The need of measuring photostimuli radiometrically is growing among physiologists and psychologists and much time has been given by the Bureau in advising them as to measuring equipment and methods of measuring radiation. Information and advice was also given to meteorologists and astronomers engaged in solar radiation work.

RESEARCH AND TESTING.

In every branch of the Bureau's work research is a prerequisite to establishing standard methods of test, and it usually develops that each line of testing gives rise to problems which require research of an exacting order. This makes it essential that research and testing be combined. From the establishment of the Bureau this has been its policy, and with industrial advance the need for research upon methods of measurement and upon physical constants becomes more pressing.

The investigation of aneroid barometers is important on account of the interest taken by the Government and the public in aviation, flying machines often being accepted upon the indications of these instruments, which sometimes vary in rating over 50 per cent under different conditions. Many makes of these instruments are on the market, and the Bureau made a critical investigation to determine their accuracy when affected by temperature changes and when operated under rising and lowering pressures at different rates. As a result, the Bureau has developed standard methods of test and certification for aneroid barometers and a circular has been prepared for publication covering the subject.

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In view of the present demands for aeronautical data, the Bureau will make comparative tests of instruments, motors, and propellers and the materials used in aviation work, and will make exact determination of such aerophysical constants for which the Bureau is equipped.

The development of methods of determining the expansion of materials from room temperature to 700 degrees centigrade (1,260 degrees Fahrenheit) is completed and the equipment installed, and a number of specimens have already been studied. Facilities will soon be available for extending the range down to the temperature of liquid air. This data, especially in the higher ranges of temperature, is of great importance in the use of structural materials.

Much experimental work has been done upon the determination of refrigeration data. An important constant has been practically established, namely, the latent heat of fusion of ice. Many constants of fundamental importance are to be determined, and the Bureau is receiving the hearty cooperation of the American Society of Refrigeration in this work. Each important constant will be determined by at least two independent methods to insure the highest reliability.

In photometry, besides the work on street lighting, the Bureau has done work on headlights and signals and prepared a report on proposed headlight legislation. The Bureau cooperated with the Baltimore & Ohio Railroad and the Post Office Department in studying the most effective postal-car lighting, which resulted in improved specifications for this purpose. The Bureau also assisted the Navy Department in the preparation of specifications, designing and testing of optical apparatus, recording cameras, etc.

The construction of a 400-foot testing tank for rating water-current meters is nearly completed; approximately 200 such meters were calibrated for different Government departments during the year. Many tests of anemometers, tachometers, fire extinguishers, steam, vacuum, and air gauges, and miscellaneous engineering instruments were made. The critical examination of measuring instruments of all kinds by the different divisions of the Bureau has resulted in direct improvement in such products. Makers of these instruments visit the Bureau to ascertain causes of failure and have appreciated the Bureau's specific criticisms which often result in immediate improvements. Likewise the Bureau is indebted to manufacturers and industrial experts for the most cordial cooperation in every branch of its work.

MATERIALS—TESTING AND RESEARCH.

The insistent demands made by the public for researches as to methods of measurement, properties of materials and finished products is due to the fact that efficiency is the keynote in industry and

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that measurement is the chief means used to solve its central problems. The Bureau of Standards has facilities and experts for this purpose. Its work on cement illustrates a line of attack upon the problem which is applicable to nearly all materials and products. The Bureau is studying the effects of each factor affecting the quality of cement, its composition, the time and temperature of burning, the fineness of grinding, etc. Through the efforts of the Bureau the Government has adopted standard specifications for cement that are accepted by manufacturers and engineers. The Bureau standardizes the methods of testing cement for its several properties, devises and standardizes the instruments for such tests, studies the significance of each test, and actually tests and certifies many thousands of samples of cement used by the Government in its larger enterprises. The Bureau is now equipped with an experimental cement plant with which it tests directly the suitability of materials for cement making and studies the specific effect of varying such condition of manufacture in a systematic manner. The properties of cements are thus studied by full laboratory tests and by service tests.

Special researches are conducted upon the strength and life of cement and concrete in actual use, e. g., in sea water and when exposed to the western alkali waters and to other conditions in service. The strength of cement and concrete are also studied by testing machines in the laboratory and by strain gauges in structures during and after erection. In this manner the manufacture and utilization of cement becomes a measured process throughout and under complete control in proportion as the results are applied in industry. The Bureau aims to apply a similar program to all industrial materials, such as metals, clays, limes, paper, textiles, rubber; structural materials, such as building stone, brick, tiling, paints and other protective coatings, and to miscellaneous materials. The aim is to acquire so definite a knowledge of the properties which fit a material for its use and the conditions under which those properties may be unfailingly reproduced in order that producer and consumer alike will be assured of high quality and steady improvement in each material and manufactured product. This comprehensive program will tax the Bureau to its utmost and will involve the most searching and difficult scientific investigations of every detail affecting the quality of the material.

The theory on which this work is based is, briefly, as follows: First, the investigation and identification of those properties upon which the quality of a material depends, and second, the defining of these qualities in such a manner as to permit of their specification and measurement. The material should be made under such measured conditions that the quality is assured and not left to chance or per-

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sonal judgment alone; it should be tested in advance of its use and if possible during its utilization in manufacturing. Finally, the conditions affecting the life and efficiency of a material should be studied in actual service, since this unites all the factors which affect its usefulness. It is becoming generally recognized that standards of quality must be developed for specific uses based upon accurate measurements of the properties which in each case determine the quality sought.

Cooperation between the Bureau and manufacturers has been found the most practical method of making its work effective. A striking readiness on the part of manufacturers to cooperate has greatly aided the Bureau in the difficult problems involved. An illustration may be found in the conference held at the Bureau during the year on the subject of paper. Government users, manufacturers, testing experts, and purchasing officers were represented; the discussions showed that there is no lack of interest in the effort to place the testing, specifications, and utilization of paper upon a scientific basis. Similar conferences are being held for the discussion of textiles, rubber, and other materials. Again, the Bureau keeps in close touch with manufacturers by visits of its experts to mills where a frank discussion of materials and methods of manufacture has been of mutual benefit. Manufacturers and testing experts in turn visit the Bureau, and by a free interchange of information misunderstandings are cleared up and a basis for the most cordial cooperation is established.

Among the researches on materials a few illustrations will show the nature of these problems. An investigation of the manufacture of true porcelain from American materials is well under way, with a view to encouraging in this country the manufacture of this and other pottery products now exclusively imported. Numerous studies in various phases of the ceramics industries have been published by the Bureau which are of direct application to these industries. The Bureau, in cooperation with the American Institute of Metals, is engaged in the preparation and testing of bronzes and brasses for the purpose of developing specifications for such alloys. An investigation is in progress upon the causes of failure of railway materials, especially car wheels, axles, and rails. Mills have been visited and measurements of rolling temperatures recorded and other data compiled for study.

The research on the volumetric changes in concrete structures owing to temperature variations and chemical reactions during the hardening of the concrete is being continued. This is a type of fundamental investigation upon vital factors affecting the utility of a material. In cooperation with other departments and with the Cement Manufacturers' Association, the Bureau has undertaken to study the effect of alkali waters on cement as used in irrigation and

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other projects. The results of a research on the process of hydration of cements are being prepared for early publication.

The behavior of rubber from the crude to the vulcanized state is being investigated by the Bureau with the hearty cooperation of rubber manufacturers. Excellent progress has been made on standard methods for rubber analysis and for the physical testing of rubber. Of immediate interest to lithographers, color-process printers, and chart and map makers is the study of the stretching and shrinkage of paper during the printing processes. This is with a view to overcoming these serious defects which now are a source of great loss to the trade. Solutions proposed lie in the direction of humidity control and the development of minimum-shrinkage papers. A conference was held at the Bureau to establish textile specifications and uniform methods of testing. Investigational work in textiles was done for the Treasury Department in the analysis of imported bagging for cotton and other materials, and for the Ways and Means Committee on technical problems involved in revising the tariff. Considerable work was done in many other lines toward establishing specifications for goods to be purchased by the various departments of the Government and testing deliveries of goods in order to ascertain their conformity to these specifications.

The specific electrical resistance and temperature coefficient of copper—constants of the greatest importance to the electrotechnical industries—have been experimentally determined and the results have been adopted not only by the interested technical societies in America but are also now recognized abroad as authoritative. Wire tables for cables based on these experiments were computed and will soon be issued.

Excellent work has been done in determining the physical constants of alcohol, in studying the chemistry of paper, in preparing specifications for oils, varnishes, turpentine, pigments, inks, asbestos, and in other chemical lines. The investigation, begun some time ago, with the purpose of correlating the magnetic, electric, and mechanical properties of iron and steel has already yielded important results and when completed promises to be of great practical utility as a reliable means of testing rails for soundness and safety.

Several new materials have been added to the excellent series of standard samples of irons, steels, and other materials prepared, certified, and distributed by the Bureau for use of technical chemists and fuel experts in checking the accuracy of their laboratory methods. The demand for these standard materials has increased greatly.

During the year the large testing machine of the horizontal type for specimens up to 33 feet in length was completed. Tensile tests up to 1,150,000 pounds and compression tests up to 2,300,000 pounds

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may be made. In cooperation with the American Society of Civil Engineers and the American Railway Engineering Association a series of column tests will be made for the verification of the formulas used in engineering design.

Supplemental to the work of the testing machines is the strain-gauge work. The strain gauge is used to measure the strains and indirectly the strength of structures during erection and later in actual service under working loads. The method is one which will afford engineers, builders, and others to check the correctness of design and the safety of structures. Experimental tests of the method have been made on large bridges, tall office buildings, on the hulls of ships at sea, on the lock gates of the Panama Canal, and on concrete street pavements.

The Bureau cooperates whenever possible with all researches which tend to minimize life hazard. The work in structural materials affords much data useful in minimizing the dangers resulting from defective materials. The scientific study of materials, not only in avoiding the loss of life and property but by increasing the efficiency of materials, is one of the important fields of usefulness of the Bureau. At the request of the Interstate Commerce Commission, the Bureau investigates the causes of railroad accidents so far as they relate to defective materials, and the Bureau's reports upon defective rails have brought sharply forward the urgency of thoroughly studying this problem. The Bureau is preparing a program for the study of the life hazard involved in high potential electric currents and in lightning discharges. The fund provided by Congress for this purpose should result in practical results of great value in reducing such dangers. In connection with the Navy Department, the Bureau made an experimental observation of sea-water temperatures in the vicinity of icebergs to furnish data for those interested in possible methods of ascertaining the presence of icebergs.

Great progress has been made toward making the work of the Bureau of Standards available and useful to the public, by the publication of scientific and technical papers, circulars of information, conferences on specific subjects, and through the technical press. Nevertheless, every effort will be made during the coming year to make it a more effective factor in solving the great problem of efficiency—the basis of all progress in science and industry.

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BUREAU OF THE CENSUS.

A very considerable part of the Census Bureau's activities during the fiscal year was in connection with the deferred work of the Thirteenth Decennial Census. The usual annual investigations regarding financial statistics of cities, production and consumption of cotton, vital statistics, and forest products were conducted; and in addition, work was done on the tobacco inquiry (authorized by act of Congress approved April 30, 1912) and the quinquennial census of electrical industries.

The last-mentioned inquiry relates to the calendar year 1912. The preparatory work was commenced in the latter part of that year, and the actual collection of statistics was begun early in 1913. By the end of June the canvass had been finished in 19 of the 76 districts and satisfactory progress had been made in the others, although in 6 of the cotton-growing States it had been found necessary temporarily to withdraw clerks in the field from the electrical-industries work in order that they might be utilized for the selection and instruction of local cotton agents.

PROGRESS OF DEFERRED THIRTEENTH CENSUS WORK.

Volumes VI and VII, on agriculture, and IX, on manufactures, of the final reports of the Thirteenth Census were issued during the fiscal year. There were also issued 50 of the 53 editions of the Abstract of the Census (one without supplement and each of the others with a supplement for a particular State or Territory); those for Alaska, Hawaii, and Porto Rico were the only ones remaining to be published after June 30, 1913. The Abstract contains, in condensed form, with text discussion, all the important results of the census for the United States as a whole, except the statistics on occupations, on mother tongue, on ownership of homes, and on the dependent, defective, and delinquent classes; and in the State supplements is given complete and detailed information on all subjects covered by the census except those just named. The publication of the results of the Thirteenth Census was, therefore, much nearer completion at the end of the fiscal year than would appear from the fact that only three of the final volumes had been issued at that time. The work on the other volumes has been progressing, and Volumes II, III, V, and VIII have been issued since the close of the fiscal year;

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the others will be out in a short time, as practically the only work remaining to be done on them is in connection with their assembling, proof reading, and printing.

The tabulation of statistics of occupations and of the dependent, defective, and delinquent classes had been deferred in order to bring the remainder of the work to completion as soon as possible, so that these lines of work were much further in arrears at the beginning of the fiscal year than were the others. Satisfactory progress was made on the occupations statistics, and at the close of the fiscal year most of the machine work had been finished. Considerable work was done on the statistics of dependent, defective, and delinquent classes during the fiscal year, but this branch of the work is not as near completion as the others.

The compilation of the statistics of mines and quarries also was not as near completion at the end of the fiscal year as most branches of the Thirteenth Census work; and it has since been decided to expedite the publication of the final report on Mines and Quarries (Volume XI) by abandoning the original scheme of issuing separate monographs on the leading mining industries, with the exception of those relating to anthracite and bituminous coal, iron ore, petroleum, and natural gas.

The cost of clerical help for the Thirteenth Census work carried on during the year was more than double that for all other Census work combined.

ADDED WORK IMPOSED BY NEW LEGISLATION.

In April, 1912, Congress passed an act providing for the collection, as of October 1 and April 1 of each year, of statistics regarding the stocks of leaf tobacco held by manufacturers and dealers. The first report under this act was made on November 27, 1912, and was received with much interest by those engaged in the tobacco trade. The second report was made on May 26, and the third on November 13, 1913.

At the same session of Congress a law was enacted providing that statistics of the consumption, stocks, exports, and imports of cotton and of the number of cotton-consuming spindles should be collected by the Bureau of the Census monthly instead of quarterly, as had been the practice, and making certain minor changes in the method of publishing the statistics of cotton production. The purpose of this legislation was to furnish producers of cotton with information concerning demand as frequently as consumers are furnished with statistics as to supply.

These two acts of Congress have materially increased the work of the Division of Manufactures of the Census Bureau. The appropriations for carrying on this additional work have been much

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smaller than were requested, but the Bureau has endeavored to make the best use possible of the funds provided.

In January, 1913, there was published a midseason report showing the amount of cotton seed crushed and linters obtained during the ginning season up to December 31. Theretofore such data had been published annually at the end of the cotton season.

WORK FOR THE FISCAL YEAR 1914.

In view of the delay in the publication of the results of the Thirteenth Census, the Director, early in the fiscal year 1914, appointed a committee consisting of the chief statistician for manufactures, the chief clerk, and the expert special agent in charge of the Division of Agriculture to investigate the work in all the divisions of the Bureau and to make recommendations which would lead gradually to a complete reorganization. This committee accumulated a large quantity of material and made a number of recommendations which resulted in great improvement of certain branches of the Bureau's work.

It is the special desire and purpose of the Director to bring the work up to date, and to this end he deemed it essential to have the assistance and advice of persons who were outside of the Census Bureau but were familiar with its work. He accordingly selected for this purpose Hon. S. N. D. North and Hon. W. R. Merriam, former Directors of the Census; Prof. Walter F. Willcox of Cornell University, who had been a chief statistician in the Bureau during the census of 1900 and who for the greater part of the time since has been connected in some capacity with the work of the office; Mr. W. S. Rossiter, who had been a chief of division and later chief clerk of the Bureau, and Hon. Daniel C. Roper, First Assistant Postmaster General, who had been an expert special agent and chief of division in the Census Bureau. These gentlemen, with the exception of Mr. Roper, were given appointments as expert special agents. After examining the material and recommendations made by the committee of the regular employees of the office, they conducted an independent investigation of conditions in the Bureau, conferring with the chief statisticians and other officials who were in charge of the different branches of the work. They found that, while the larger proportion of the work of the Thirteenth Census had been finished, nevertheless a considerable quantity of statistical information collected at that census still remained to be tabulated and published. The most serious delay was in the work on statistics of occupations. This, however, as already stated, had been deferred, along with certain other branches of the work, in order to permit the publication of the balance of the reports at the earliest possible date. The work on some of the annual reports of the Bureau—in particular,

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Financial Statistics of Cities, 1912, and Mortality Statistics, 1911 and 1912—was also far in arrears.

The expert special agents advised the Director that no additional tabulations or analyses should be undertaken in connection with the unfinished branches of the Thirteenth Census work, and that the work on those branches and on the delayed annual reports could and should be curtailed so as to insure their publication not later than December 31, 1913. The recommendations of the expert special agents are as follows:

1. That the proposed second machine run of the cards for the purpose of tabulating occupations be abandoned, thus expediting the time of production by about six months and reducing the cost of finishing that branch by about $65,000; and that the tables yielded by the first run of the cards be printed without derivative tables or text. These tables give the number of persons of each sex in each occupation, and classify them by race, nativity, and parent nativity, and five age periods, thus insuring the publication of the primary classification of occupational data as reported at previous censuses.

2. That the report upon native tongues be limited to the chapter to appear in the forthcoming final volume on population.

3. That the tables relating to mines and quarries now in the form of printed bulletins, proofs, or manuscript be sent to the Public Printer at once, the same to constitute the final report on mines and quarries, and that no further tabulation or text be prepared in connection with that report.

4. That tables for the benevolent institutions, and for the institutional population—namely, prisoners, insane and feeble-minded, and paupers—be prepared and published without further percentage or other derivative tables and without analytical text.

5. That the annual compilation of the statistics of forest products be abandoned. There appears to be no authority of law for an annual inquiry of this character, which the records show to have cost from $20,000 to $40,000 a year.

6. That the annual report on financial statistics of cities for 1912 be completed and published by January 1, 1914, by curtailing the amount of detail to be included; that the schedules and report for 1913 be similarly curtailed; that the reports for the years 1912 and 1913 be printed without text, except such as is necessary for explanation and definition; and that until the annual reports on the financial statistics of cities are brought up to date, no attempt be made to prepare a report on general municipal statistics. This recommendation is based on the fact that delay in the compilation and publication of the annual municipal reports detracts seriously from their value.

7. That reports on mortality statistics for the years 1911 and 1912 be published before the close of the present calendar year. To make this possible, the text of these reports should be reduced to a minimum or omitted, the tables condensed, and no effort made to publish a report on births until the mortality reports are published.

8. That work upon the standardization of death rates, life tables, and occupational mortality be suspended until the above reports have been published. There is no reason why the mortality report for each year should not be compiled and published prior to the close of the succeeding calendar year.

9. That the emergency presented by the delay in completing the Thirteenth Census justifies the Director in requesting the Secretary of Commerce to lay the matter before the President with the view of securing his instructions to the Public Printer to give precedence so far as practicable to the remaining publications of the Thirteenth Census and the annual reports long overdue.

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These recommendations are being followed, and it is believed that the deferred Thirteenth Census work and the delayed annual reports will be completed and published before January 1, 1914.

Official Register.—Work on the Official Register for 1913 is progressing as rapidly as possible. The necessary information has been obtained from the several departments and offices, and its compilation is now well toward completion.

As a result of suggestions made by the Department of Commerce, the following provision was incorporated in the urgent deficiency bill approved October 22, 1913:

> Hereafter the Official Register of the United States shall not contain the names of those persons heretofore published in Volume II relating to the postal service, namely, postmasters, assistant postmasters, clerks in post offices, city and rural carriers, employees of the sea-post service, employees of the Railway Mail Service, employees of the mail messenger service, and mail contractors; nor shall it contain the statement of allowances made to contractors for carrying the mails or the list of ships and vessels belonging to the United States, as heretofore published in the said Official Register; and all Acts or parts of Acts inconsistent with the foregoing provision are hereby repealed.

This legislation will greatly simplify the preparation of the Official Register and will very materially decrease the expense of the work. Heretofore it has been necessary to obtain the names of the employees of the Postal Service by correspondence with each postmaster in the United States. The number of such employees on June 30, 1913, was 290,605. Volume II of the last edition of the Register (1911) contained 774 pages, and the cost of printing alone was $12,600. It is believed by the Department of Commerce and by the Post Office Department that the practical value of this volume has not been sufficient to justify the labor and expense involved in its preparation.

The Director of the Census has called attention to the fact, already pointed out by his predecessor, that the Official Register in its present form (even with the names of postal employees omitted) is unnecessarily expensive and cumbersome. He believes that the following plan, which modifies slightly the one proposed by his predecessor, will, if adopted, result in very material saving to the Government and will at the same time preserve all the valuable features of the present Official Register:

(1) The establishment of a card directory, prepared and maintained by the Civil Service Commission from information furnished by the executive departments and independent offices, showing the name and status of every person in the Government service except the officers and enlisted men of the Army, Navy, Marine Corps, and Revenue-Cutter Service. Lists of officers of the Army, Navy, and Marine Corps are already published annually in the Army Register and Navy Register, issued by the War and Navy Departments, respectively.

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(2) The elimination from the Official Register of detailed lists of all employees, by name.

(3) The publication annually by the Bureau of the Census of an official register containing—

(*a*) A list of all employees of the Government (except officers and enlisted men in the Army, Navy, Marine Corps, and Revenue-Cutter Service) whose duties are of an executive, supervisory, technical, or professional character, and whose compensation is $2,000 or more per annum.

(*b*) Statistics relating to the Government service, to be prepared from the Civil Service Commission's card directory.

A bill substantially embodying this plan (except that $1,500 was fixed as the lowest compensation of employees whose names should be included in the Official Register) was introduced in the House of Representatives on August 8, 1913, by Hon. W. C. Houston, of Tennessee.

Electrical industries.—The field work for the census of electrical industries has been finished. The examination of the returns is now in progress, and the tabulation has been begun. It is expected that the preliminary report will be ready for publication in February, 1914, and that the final report will be ready for the printer early in the following spring.

Cotton statistics.—While the collection of statistics of the quantity of cotton ginned from the crop of 1913 has proceeded in the same manner as heretofore, the Bureau has been able to arrange for the more frequent publication of these statistics by counties. It had been the practice to publish county figures only for December 13 of each year and at the end of the season, the State totals alone being given at other times. There was, however, a great demand for information as to the quantity of cotton ginned in the individual counties up to the date of each ginning report, and the Census Bureau accordingly gave the local special agents permission to publish this information in the county newspapers just as soon as their reports could be received at the Bureau in Washington and the data verified. The local papers throughout the Southern States have been greatly pleased by this action of the Census Bureau, and many of them have written the office expressing their appreciation of it.

Requests have been made of ginners for suggestions in regard to improving the method of collecting and publishing statistics of the quantity of cotton ginned, and almost invariably the replies have indicated complete satisfaction with the way in which the work is now being done.

The Bureau of the Census has also arranged for an additional report on cottonseed and linters, which will show the quantity of seed crushed and linters obtained from the crop prior to December 1

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of each year. Heretofore there have been only two reports issued annually on this important subject, one showing the quantity of seed crushed prior to January 1 and the other, published at the end of the crushing season, showing statistics of the total quantity treated.

Tobacco statistics.—As already stated, three semiannual reports of the quantity of leaf tobacco on hand, relating to October 1, 1912, April 1, 1913, and October 1, 1913, respectively, have been made by the Bureau.

The Bureau of the Census has been able to make more satisfactory cooperative arrangements with the Bureau of Internal Revenue in connection with the collection of these statistics for the forthcoming report than it was able to make for either of the two preceding ones, so that it is now possible for the Bureau to secure, by correspondence with the collectors of internal revenue in the different districts, the names and addresses of the establishments covered by the law, together with all the information it requires in regard to delinquent establishments and establishments whose mail has been returned by the post offices as undelivered. This arrangement obviates the necessity of sending special agents into the field to secure the information, thus materially expediting the work and reducing its cost. The collectors have responded very promptly to the Bureau's requests for information of this character.

Financial Statistics of Cities.—In compliance with recommendation No. 6 of the expert special agents, the annual report on Financial Statistics of Cities for 1913 will be published in 1914 with somewhat less detail than has been included in many of the earlier reports, and will contain no text except such as is necessary for explanation and definition.

Vital statistics.—The Division of Vital Statistics, in accordance with recommendations Nos. 7 and 8 of the expert special agents, will publish the annual reports on Mortality Statistics for the years 1911 and 1912 before the close of 1913. In order to do this it will be necessary to omit certain rate tables and explanatory text, but the omission will be supplied in the report for 1913, which will be published considerably before the close of 1914.

Wealth, debt, and taxation.—The urgent deficiency act approved October 22, 1913, authorized the use of not to exceed $50,000 of the unexpended balance for collecting statistics for the fiscal year 1913. This sum will be utilized in conducting the intercensal inquiry on wealth, debt, and taxation. So far as possible, the printed reports of the various State and other governmental units, and such other reports as may be available, will be used by the Census Bureau as sources of information. This will make it necessary in many cases to use data for the fiscal year 1912. The Bureau is now engaged in collecting all reports of this nature which can be secured without cost,

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and has already accumulated a large amount of material. A critical study is being made of the data at hand, with a view to ascertaining just what can be done with printed and other available reports before sending employees into the field to make the actual canvass. The Post Office Department has been requested to cooperate with the Department of Commerce by directing postmasters in small towns, to which it would not be feasible to send agents of the Census Bureau, to furnish certain of the data needed. The scope of the report on this subject will be substantially the same as that of the preceding one, which related to the year 1902.

OFFICE FORCE.

Permanent employees.—The legislative, executive, and judicial appropriation act for the fiscal year 1913 provided for 610 permanent employees of the Census Bureau, or substantially the same number as had been authorized for the fiscal year 1909 (626), prior to the Thirteenth Census period. The distribution of the employees among the several salary classes in 1913 differed materially, however, from that which prevailed in 1909, the number of positions in the higher classes and in the $900 class being increased and the number at $1,200 being reduced.

The appropriation act for 1914 created seven additional positions at $1,400 and five additional places at $1,200 and reduced the number of $900 positions by one, thus increasing by eleven the total number of places on the permanent roll of the Bureau.

The appropriation act for 1913 provided that the Civil Service Commission, in certifying eligibles from the examination registers for appointment to positions on the permanent roll of the Bureau during the fiscal year 1913, at salaries of $1,200 or less, should, so far as practicable under the law of apportionment, give preference to those who had had at least one year's experience in census work. A statistical-clerk register was established by the Civil Service Commission for the special use of the Census Bureau. Prior to the establishment of this register appointments to the Bureau's permanent force were made principally from the departmental-clerk register, but later, after the statistical-clerk register had been established, most of the permanent appointments were made therefrom. The majority of the clerks drawn from these two registers had been temporary Thirteenth Census employees and were given preference in certification under the provision of law just mentioned.

Temporary force.—The appropriation act for 1913 authorized the employment of not to exceed 175 temporary clerks in the Census Bureau at salaries not to exceed $900, and appropriated $120,000 for that purpose. It was further provided that these clerks should be appointed from among the former temporary Thirteenth Census

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employees. These 175 temporary clerks were appointed at $720 per annum. Inasmuch as the appropriation act did not pass until August 23, it was not possible to appoint any of them before September 1, and many were not appointed until about October 1. Consequently, the appropriation of $120,000 was considerably more than sufficient to compensate the 175 employees until the end of the fiscal year. The Bureau therefore asked for authority to increase the number of these employees without an increase in the amount of the appropriation. This authority was granted by the appropriation act for 1914, which was approved March 4, 1913. The temporary force was accordingly increased until it reached a maximum of 265 in May and June, 1913. On June 30, 1913, all these temporary positions lapsed under the terms of the act creating them.

APPROPRIATIONS AND EXPENDITURES.

Financial statement, fiscal year 1913.

Administrative:			
Salaries for administrative places		$36,179.15	
Salaries for Division of Correspondence and Mail		20,026.50	
Salaries for library		4,987.24	
Salaries for watch, labor, and char forces		26,580.07	
Rent		21,000.00	
Stationery		9,869.20	
Miscellaneous expenses		14,767.29	
Books and periodicals		487.72	
Total			$133,897.17
Geographer's Division: Salaries			19,740.23
Machine shop:			
Salaries		23,246.00	
Materials, supplies, etc		3,349.12	
Total			26,595.12
Thirteenth Census work:			
Population—			
Supervision	$11,518.35		
General and State reports	93,458.32		
Occupations	177,985.38		
Foreign born	445.12		
Tenure of homes	16,138.59		
Total		304,545.76	
Agriculture—			
Supervision	8,362.38		
General and State reports	31,396.73		
Color, tenure, and size	16,651.42		
Plantations and ownership of tenant farms	14,913.17		
Irrigation	2,831.29		
Total		74,154.99	
Manufactures—			
Supervision [a]	9,708.99		
Completion of manufactures reports	41,819.74		
Industrial districts	1,276.62		
Mines and quarries	17,416.89		
Total		70,222.24	
Institutions		39,167.07	
Revision and Results		24,319.79	
Publications		11,333.21	
Total			523,743.06

[a] Includes cost of supervision for forest products, cotton, tobacco, and electrical industries.

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Annual investigations:		
Cotton	$253,291.44	
Tobacco	25,509.76	
Electrical industries	24,544.18	
Forest products	19,045.37	
Vital statistics	81,709.16	
Statistics of cities	82,371.41	
Total		$486,471.32
Miscellaneous		7,393.91
Grand total		1,197,840.81

Title of appropriation.	Appropriations.	Expenditures.	Balance.
Expenses of the Thirteenth Census, 1913	[a] $102,339.30	$99,998.68	$2,340.62
Salaries, Bureau of the Census, 1913	[a] 593,823.28	574,250.58	19,572.70
Temporary clerks, Bureau of the Census, 1913	120,000.00	116,194.66	3,805.34
Tabulating machines, Bureau of the Census, 1913	[b] 26,643.93	26,595.12	48.81
Collecting statistics, Bureau of the Census, 1913	342,000.00	291,137.25	50,862.75
Tobacco statistics, Bureau of the Census, 1913	15,000.00	14,999.83	.17
Cotton statistics, Bureau of the Census, 1913	30,000.00	28,543.97	1,456.03
Rent, Bureau of the Census, 1913	22,080.00	21,000.00	1,080.00
Contingent expenses, Department of Commerce and Labor, 1913	25,500.00	25,120.72	379.28
Total	1,277,386.51	1,197,840.81	79,545.70

[a] Because of complications arising from the fact that the Bureau operated under joint resolutions of Congress from July 1 to Aug. 22, 1912, inclusive, the appropriation for "Salaries, Bureau of the Census, 1913," was divided by the Treasury Department into two parts—one, under the head "Expenses of the Thirteenth Census, 1913," amounting to $102,339.30; and the other, under the original head of "Salaries, Bureau of the Census, 1913," amounting to $593,823.28. The sum of these two items ($696,162.58) is a little less than the amount originally appropriated ($696,340).

[b] Includes $643.93 reimbursement for work done for Bureau of Immigration.

Fiscal year 1914.—The appropriation for 1914 was $1,122,820. The item for salaries was increased to $711,240, the item for collecting statistics reduced to $354,000 (as compared with $387,000 in 1913, this amount including $45,000 for collecting statistics of cotton and tobacco), and the item for tabulating machines reduced to $10,000. No new appropriation was made for printing and binding the results of the Thirteenth Census, but the unexpended balance of the appropriation for 1913 was reappropriated and made available for 1914.

Fiscal year 1915.—The amount estimated for the fiscal year 1915 is $1,709,720. The estimate for salaries has been increased to $722,140, that for tabulating machines to $15,000, and that for collecting statistics to $925,000. The estimates for the other items are the same as the amounts appropriated for 1914.

In connection with the estimate for salaries, a reclassification has been asked for. The present and the proposed constitution of the office force of the Bureau (exclusive of special agents) are shown in the following statement:

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PRESENT OFFICE FORCE.		OFFICE FORCE ACCORDING TO ESTIMATES FOR 1915.	
Director	$6,000	Director	$6,000
Chief clerk	2,500	Chief clerk	2,500
		Chief statistician	3,250
4 chief statisticians, at $3,000 each	12,000	2 statisticians, at $3,000 each	6,000
		Statistician	2,750
		2 assistant statisticians, at $2,200 each *	4,400
Geographer	2,000	Geographer	2,000
Stenographer	1,500	Stenographer	1,500
8 expert chiefs of divisions, at $2,000 each	16,000	8 expert chiefs of division, at $2,000 each	16,000
11 clerks, at $1,800 each	19,800	12 clerks, at $1,800 each	21,600
		12 clerks, at $1,680 each	20,160
20 clerks, at $1,600 each	32,000	15 clerks, at $1,560 each	23,400
		18 clerks, at $1,440 each	25,920
39 clerks, at $1,400 each	54,600	23 clerks, at $1,380 each	31,740
		34 clerks, at $1,320 each	44,880
		54 clerks, at $1,260 each	68,040
305 clerks, at $1,200 each	366,000	149 clerks, at $1,200 each	178,800
		46 clerks, at $1,140 each	52,440
		34 clerks, at $1,080 each	36,720
83 clerks, at $1,000 each	83,000	41 clerks, at $1,020 each	41,820
		18 clerks, at $960 each	17,280
86 clerks, at $900 each	77,400	85 clerks, at $900 each	76,500
Subclerical force	38,440	Subclerical force	38,440
Total	711,240	Total	722,140

* The two assistant statisticians at $2,200 are in lieu of two office special agents at $6 per day, whose compensation would be paid from the appropriation for collecting statistics. A corresponding reduction has been made in the estimate for this item, so that, while the increase in the estimate for salaries as compared with the appropriation for 1914 is $10,900, the net increase in the estimate for compensation of office employees, including special agents, is only $6,500.

The object of this proposed change is twofold—first, to provide a larger proportion of places in the higher salary classes; and, second, by increasing the number of salary classes, to make possible more frequent promotions.

The Bureau has at present an unduly large proportion of its employees in the $1,200 class, although there has been a considerable improvement in this respect since the fiscal year 1909. The proposed reclassification, while calling for only a slight increase in the total appropriation for salaries, provides for a material increase in the number of higher-salaried positions. The estimate calls for 12 clerks at $1,800 as compared with 11 at present; for 12 clerks at $1,680 and 15 at $1,560, or 27 at an average salary of about $1,620, as compared with 20 at $1,600 in the present classification; and for 18 at $1,440, 23 at $1,380, and 34 at $1,320, or an aggregate of 75 at salaries ranging from $80 below to $40 above $1,400, as compared with 39 at $1,400 in the present classification.

Furthermore, as already stated, the proposed classification, if carried into effect, will, by providing so many more salary classes, make

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possible more frequent promotions, with a resultant improvement in the esprit de corps.

The increase of $5,000 in the estimate for tabulating machines is made because of the increase of work in the mechanical laboratory incident to the census of manufactures.

The large increase ($571,000) in the estimate for collecting statistics is accounted for mainly by the item of $566,400 for the quinquennial census of manufactures, which will relate to the calendar year 1914. The last previous census of manufactures, relating to the calendar year 1909, was taken at a cost for field work of $517,044. The increase in the estimated cost is due largely to the fact that the census of 1909 was taken in connection with other field work, so that the cost of each branch was greatly reduced.

An item of $18,000 is included for transcripts of birth records. No corresponding appropriation was made for 1914. Slight increases are made in the items for transcripts of death records and statistics of cities, and slight decreases appear in the items for cotton statistics and tobacco statistics.

A reduction of $4,400 is made in the estimate for salaries of expert special agents to offset an item of that amount for salaries of two assistant statisticians (new positions) at $2,200.

My report of the conditions in the Bureau of the Census would not be complete without making record here of the correspondence between the Director and myself regarding the safety of the records in that building.

Under date of September 27, 1913, the Director wrote me as follows:

> There are in my custody in the Census building a number of volumes of the returns of the census from 1790 to 1900, which are of great value, and it would be impossible to replace them if they were destroyed. The names of the heads of families returned at the census of 1790 were considered of such great value that they were published, in order that they might be placed on record in different libraries and render it impossible for all to be destroyed. These returns, however, are incomplete, as we have no returns for the State of Delaware for 1790; none for the State of Georgia for 1790, 1800, and 1810; Kentucky is missing for 1790 and 1800; New Jersey from 1790 to and including 1820; Tennessee from 1790 to and including 1810, and Virginia for 1790 and 1800. A number of the missing returns referred to were destroyed when the Capitol was burned by the British, and the others from fires in the Patent Office.
>
> In addition to the records of population, we have the following-named bound volumes:

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Subject.	Number of volumes.
Agriculture	644
Mortality	131
Social statistics	43
Industries	197
Defectives	68
Total	1,083

The total number of volumes from 1790 to 1880 comprised 4,622. In 1890, when the schedules were not bound, we had approximately 44,000 bundles of schedules. For 1900 we have 2,812 volumes. The population returns for 1910 are in a fireproof vault and fill it completely. They have not been bound and are constantly referred to. The census returns from 1790 to and including 1900 are continually referred to for genealogical purposes, and the returns for 1850 and 1860 are constantly being examined to secure data showing the ages of pensioners, as they are unable to obtain any other record evidence of their ages. These volumes, especially, are proving invaluable and could not, of course, be replaced if they were destroyed, and as time passes by the census returns will prove of greater value, as it is the only list to which individuals can refer in order to establish relationship in their families, often required in settling estates.

In addition to the census returns, we have many division records, the loss of which would cause great embarrassment and thousands of dollars would have to be expended to attempt to replace them. For instance, the Geographer's Division has the plans of division into enumeration districts, into which the country was divided in 1910. These official records, if lost, could not be replaced and would involve great expense in the preparation for the Fourteenth Census. There are in all the divisions of the Census Bureau division records that are essential in preparing for another census, and they would all be lost if there was a fire which destroyed the present building occupied by the Census Bureau. As a precautionary measure, I have had the chief clerk post "No smoking" placards throughout the building and have issued an order positively prohibiting smoking in any part of the present building. While orders against smoking were previously issued by my predecessors, I have been informed that no action was taken to enforce them in toilet rooms and among the higher officials. It will probably be necessary for me to take drastic action in some case in order to show, by example, that there must be no smoking in the present Census building.

The necessity for a fireproof vault to inclose these records has been conceded at every enumeration, and when the present Census building was built a vault was placed therein, which was large enough to hold all the returns of population from 1790 to 1900, except the schedules for 1890. This vault now contains only the unbound population schedules for 1910. The bound volumes containing the returns of the other censuses, except 1890, have been placed on metallic shelves in the northern part of the large east room. The census schedules from 1790 to 1900, except those of 1890, now occupy in the Census Bureau a space 45 by 26 feet, 12 feet high. The population returns for the census of 1890 require about as much space as the returns for the other enumerations; that is, if

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we attempted to place the returns in a vault, it would have to have approximately 2,340 square feet for cases at least 12 feet high.

To this I replied on October 3, as follows:

Referring to your communication of the 27th on conditions as regards the fire risk to valuable records in the building at present occupied by your Bureau, let me say that your instructions prohibiting smoking are approved, as is also your intention to enforce them strictly. Kindly give consideration to any other precautions that may further provide safety, such as absolute cleanliness in out-of-the-way places, supervision of the night watchmen, provision of fire-extinguishing appliances readily accessible, arrangements for the prompt removal of the more valuable part of the records in case of fire. In short, take whatever steps your judgment suggests and the means at your disposal permit to prevent loss.

Take a note to bring the matter again to my attention the latter part of November that I may bring the subject before both Houses of Congress in the hope that they may provide funds which will permit our putting these invaluable records into a condition of safety. In the meantime I suggest your sending a copy of your letter to me and of this, my reply, to the Chairmen of the House Committee on the Census and the Senate Committee on the Census, in order that they may be fully informed.

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BUREAU OF FISHERIES.

FISH-CULTURAL WORK.

Although there were no material changes in the methods pursued, and the appropriation for the propagation of food fishes was the same as in the preceding year, the output of fish and eggs during the fiscal year 1913 was the largest in the Bureau's history. This was due to an improvement in the efficiency of the personnel and to the extension of the work into new productive fields by the operation of inexpensive auxiliary stations at well-selected points.

The total output of the hatcheries was 3,863,593,000, of which 3,421,591,000 were fry, 19,726,000 were fingerlings, yearlings, and adults, and 422,276,000 were eggs, most of the latter being furnished to States for hatching and planting within their own borders under the direction of local fishery authorities. Thirty-four permanent or main hatcheries and 102 substations and egg-collecting stations were operated during the year in 30 States and the Territory of Alaska. Two additional stations are in course of construction. The lobster and 39 species of fish were propagated, of which 12 species were handled in excess of 50 million each, yet despite the variety and the enormous and increasing scope of the operations it is impossible to satisfy the demand for fish to stock public and private waters.

As compared with the preceding year there were conspicuous increases in the hatch of chinook, silver, and dog salmons. The conditions on the Sacramento River and its tributaries and at other places in California, low water during part of the season and freshets later, reduced the collections of eggs of the chinook and silver salmons in that State, but this was more than compensated for by the favorable climatic conditions on the Columbia River and at other places in Oregon. The two Columbia River hatcheries were taxed to their utmost capacity and eggs were still available when all facilities for handling them were exhausted. At Baker Lake and auxiliary stations in Washington the output of chinook, blueback, silver, and dog salmons and steelhead trout was about double that of the preceding year, and at the Puget Sound stations a slight falling off, due to the destruction of retaining racks by freshets, was more than offset by collections at several new field stations.

The operations of Afognak station, Alaska, were seriously interfered with by the eruption of Katmai Volcano on June 6, 1912, which

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covered the island with ash and sand to an average depth of 9 inches. It is estimated that 20,000 adult salmon were killed at the head of Litnik Lake, while thousands more were driven from the streams during the spawning season. Not only were the conditions such as to militate against the collection of eggs, but heavy losses were sustained among the comparatively few collected, owing to the accumulation of volcanic ash in the hatching troughs. Toward the end of the year temporary field stations were established to test the conditions for egg collecting at Eagle Harbor and Eganak Lake, on Kodiak Island.

The facilities at Yes Bay station, Alaska, were improved and augmented during the year, but the take of blueback-salmon eggs was 8 or 9 per cent below that of the preceding year, owing to low water, followed by heavy freshets which destroyed the racks and liberated several thousand ripe fish.

Despite the magnitude of the fish-cultural operations on the Pacific coast, the intensity of the salmon fishery is such that in many places there is a distinct falling off in the run. There is no doubt that part of this decrease is occasioned by defective State administration and legislation, but in a further attempt to overcome the retrograde tendency of the catch it is the purpose of the Bureau to so modify its methods in respect to the salmons as to rear a larger proportion of them before they are planted. It is believed also that the basis of cooperation with the States may be changed for the better.

The take of shad eggs at the stations in the Chesapeake Basin was less than 40 per cent of that of the preceding year, and there is no doubt that this is in large part due to the character of the fishery in the bay and its tributary streams. The number of the pound nets is excessive and they are set in strings which extend miles from shore and, together with the anchored gill nets, effectively obstruct the passage of the fish to their spawning grounds in the rivers. The conditions are similar to those formerly obtaining in Albemarle Sound and the upper part of Pamlico Sound, N. C., but which the enlightened policy of the State has corrected. As the result of the maintenance of a continuous open passage from the sea to the rivers, the catch of shad in North Carolina during the past season was as great as or greater than in any other year of the history of the fishery, and the take of eggs at Edenton station, N. C., reached 138 million, compared with the low-water mark of 6 million the year before remedial legislation was enacted. The fishing industry and the fish-food supply of the Virginia rivers are seriously menaced unless prompt and effective steps are taken to improve existing conditions. A conference of the authorities of Virginia and Maryland with officers of the Bureau of Fisheries has been held, from which it is hoped effective results may spring.

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On the Great Lakes and other waters near the Canadian boundary the results of operations were various. The take of lake-trout eggs on Lake Superior, owing to storms, was below expectation in both quantity and quality, and on Lakes Huron and Michigan it was interfered with by the lateness of the season, which brought the climax of the spawning into the close time when no eggs could be obtained. While storms interfered with the whitefish work at the Michigan stations, Put-in Bay station, on Lake Erie, had the most successful season in its history so far as this species was concerned. On the contrary, the pike-perch work on Lakes Huron and St. Clair was vastly more successful than in the preceding year, while on Lake Erie storms and flood water rendered it very disappointing. On Lake Champlain the take of pike-perch eggs was comparatively small and would probably have been an almost complete failure had it not been for the establishment of a collecting station and fish pen at Sandy Point, a step which will probably insure greater efficiency in the future.

Lobster culture was conducted at but two stations (Boothbay Harbor, Me., and Gloucester, Mass.), nothing being done with this species at Woods Hole, as the number of available brood lobsters on the Massachusetts coast was insufficient to warrant the operation of two hatcheries in that State. The stock of brood lobsters at Boothbay Harbor was the largest ever secured, but the average size was smaller and an unusual number dropped their eggs in the pound, so that the take of eggs was smaller than in the preceding year. The spring collection of brood lobsters at Gloucester was the poorest for many years. During the spring 106 lobsters, with eggs attached, were liberated off Cape May, N. J., in an attempt to establish the lobster more abundantly in that vicinity.

Flatfish were unusually scarce at Boothbay Harbor during the spawning season, but the loss in incubation was unusually low, and 413,961,000 fry were hatched. At Gloucester 230,070,000 were hatched and distributed, about two-thirds as many as in the preceding year, the falling off being due to the extraordinary crowding of the hatchery with other species. At Woods Hole the supply of brood fish was abundant, but the eggs were of indifferent quality and the mortality was high. Cod were not as abundant as usual at Boothbay Harbor, but great numbers were hatched at Gloucester and Woods Hole. Haddock were taken in large numbers in the vicinity of Boothbay in April and about 100 million eggs were secured for the station. The take of eggs at Gloucester was also unusually heavy and, with the other species handled there, taxed the facilities of the station to such an extent that in addition to shipments to Woods Hole nearly 200 millions of partly incubated pollock, cod, and haddock eggs

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were planted off the harbor. On the whole, the work of the marine stations was highly productive.

At the fresh-water stations of the Bureau the conditions were generally satisfactory, but the product of the pond stations devoted to the propagation of black bass and related species, though greater than ever, was as usual wholly unequal to the demand. An increase in the facilities for this branch of the work is urgently needed and it is hoped that requirements will be to some extent satisfied by the stations now under construction in Kentucky and South Carolina. It is probable, however, that black bass can not be supplied in quantities equal to the demand for some time to come.

At some of the trout stations it has been found economical to supplement the supply of brook-trout eggs derived from the brood fish carried in ponds and collected from wild stock by purchase from commercial hatcheries, and the total output of the species has been increased, while, owing to unfavorable climatic conditions, the product of rainbow trout fell off during the year.

In the Yellowstone National Park the provision of additional facilities and the extension of the field of operations resulted in the collection of 29 million blackspotted-trout eggs, more than double the number secured in any previous year. Plans will be made to further increase the work in this field, at present the chief source of the Bureau's supply of eggs of this species.

Owing to high water it was not possible to secure eggs of the steelhead trout from the tributaries of Lake Superior, but 50,000 eggs were transferred from the Pacific coast to Duluth and after hatching were planted in these streams. About 176,000 eggs were obtained from Lake Memphremagog, where the Bureau has introduced this species, and were hatched at St. Johnsbury, a new departure in fish culture at that station. The steelhead, which is a western species, is becoming important in the eastern waters in which it has been introduced, not only as a game fish but as a valuable and growing factor in the commercial fisheries.

The rescue of fishes left by the recession of overflow waters in the Mississippi Valley was prosecuted with varying success. These fishes (black bass, crappie, sunfish, catfishes, and other river species) are taken from the sloughs where otherwise they would die, and are either returned to the main streams or used for stocking other inland waters.

The Bureau regards as one great object of its activities the ability to supply in large numbers a fish suitable for the shallow, warm-water ponds and streams of the western farming country, and to this end it is experimenting with the propagation of the buffalofish, though as yet with indifferent success.

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INVESTIGATIONS AND SURVEYS.

At the request of the State authorities a survey of the oyster bottoms of Lavaca Bay, Tex., was begun by the steamer *Fish Hawk* early in February, 1913, and continued until completed in May. At the end of the fiscal year the plotting and computations had been finished and the report will be completed during the current year. Investigations of enemies of the oyster have been made as opportunity has been afforded, but the lack of continuity in this work caused by the insufficient personnel has prevented rapid progress. The Bureau has repeatedly urged that additional assistants be provided for work in connection with shellfishes, but although the oyster interests of all parts of the country are asking for aid the appeal has been thus far unheeded by Congress. The oyster, clam, and crab fisheries yield a first product valued at about $17,000,000, yet they receive less consideration at the hands of the Government than is given to stocking for purposes of sport the minor waters of a single State.

Mussel propagation in the Mississippi Valley assumed during the year proportions which warrant expectation of commercial results, 150 million larval mussels being planted in 15 localities. The most extensive work was at Lake Pepin, Minn., and in the vicinity of Fairport, Iowa, but plants of consequence were made at other places in Minnesota and Iowa and in Wisconsin, Illinois, Indiana, and Arkansas. As a necessary part of these operations about 100,000 food and game fishes were handled, of which a large number were rescued from overflowed lands and returned to the rivers. Laboratory and field investigations have opened up sources of information which will make it possible to propagate a larger quantity and greater variety of mussels during the ensuing year.

Field operations were curtailed by the delay of appropriations early in the year, but examinations were made of the mussel resources of several localities, one of which opened up a possible new source of supply of commercial shells.

The investigation of the Illinois River in respect to the effects of the discharge of sewage from the Chicago Drainage Canal was completed. The report, which is ready for publication, furnishes valuable data on the general subject of the pollution of streams.

The waters of the Truckee River Basin were under investigation at various times during the year. As has been indicated in previous reports of the Bureau, the use of the waters of this region for irrigation purposes has already reached a stage resulting in the destruction of large numbers of valuable food fishes. It appears inevitable that with the growth of the area irrigated the streams eventually will be reduced in places to practically dry beds at certain seasons, and the native fishes will become a negligible factor in the

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food supply. It is possible that a way may be found to compensate for this deficiency by introducing other species of nonmigratory habit which can be acclimatized to the permanent waters, but it is becoming yearly more evident that it will be necessary in some cases to make a frank recognition of the fact that more and cheaper food can be produced in arid regions by the irrigation of the land than by the conservation of the fishes in the streams. It is the purpose of the present investigation to determine whether it is possible to develop the one source of food supply while maintaining the other.

During the summer of 1912 the Bureau continued its examinations of lakes in Washington and Idaho to determine their physical and biological characteristics, particularly as they may affect the culture and acclimatization of fishes. It frequently happens that disappointing results follow the planting of fish in lakes which superficially appear to be admirably adapted to the purpose, and recent investigations have shown that the failures are often due to the physical conditions of the deeper waters.

During July and August, 1912, the schooner *Grampus* was employed in an investigation of the oceanography of the Gulf of Maine, with the purpose of determining the physical and biological conditions governing the distribution of fish food and young fishes. The work was supplemented during the winter and spring by observations off the coast in the vicinity of Gloucester and on Georges Banks in connection with the trawl investigations.

Terrapin culture at Beaufort reached a stage which justified the Bureau in issuing a circular descriptive of its methods and commending it as promising financial returns to persons undertaking it on a business scale. Considerable interest has been manifested in the project, and commercial experiments are being conducted under private auspices in North Carolina and Florida.

During the year considerable progress has been made in the accumulation of material toward a series of publications on the life histories of important food fishes and other valuable aquatic animals. This necessarily is slow work, as much of the data is collected in connection with other investigations.

The marine laboratories at Woods Hole, Mass., and Beaufort, N. C., were opened at the beginning of the fiscal year, but were operated with considerable embarrassment, owing to the inadequacy of the appropriations made available pending the passage of the sundry civil bill. The months of June, July, August, and the first half of September comprise the period of greatest activity in scientific field and laboratory work, owing not only to the clemency of the weather and the greater opportunities afforded for study but also to the availability at that time of a considerable number of qualified investigators who are occupied in university work at other seasons.

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At the close of the year the permanent laboratory at Fairport station was ready for occupancy. This station, which combines facilities for fish culture, mussel culture, practical shell testing, and biological and chemical investigations and experiments, is designed as a center of a large part of the Bureau's activities in the Mississippi Valley.

COMMERCIAL FISHERIES.

Oyster industry.—The canvass of the oyster industry which was begun in 1910 was concluded during the year by the completion of the statistics of Maryland and Virginia and the States of the Pacific coast. Maryland ranks first in the number of persons engaged in the industry, which in 1912 was 24,287, who received $2,724,641 in wages. The yield of oysters was 5,510,421 bushels. But 280,010 bushels, valued at $149,069, came from planted grounds, the recent legislation for the encouragement of oyster culture not having been operative for a sufficient period to have its effects shown in the yield. The application for leases under this law encourages the belief that the State may before long regain her proper place as an oyster producer. Her status, so far as the employment of labor is concerned, is conditioned by the magnitude of her wholesale trade, which was valued at $4,640,173, and the use of hand apparatus only in taking oysters.

Virginia in 1912 had 16,487 persons engaged in the industry and the wages paid amounted to $2,112,170; 6,206,098 bushels of oysters were produced, and 36 per cent of the quantity and 50 per cent of the value were yielded by the planted beds. The wholesale trade of the State was valued at $2,653,590.

On the Pacific coast the industry appears to be in a depressed condition, and there has been a heavy decrease in both the quantity and quality of the product during the past 10 years. In California the entire product is derived from planted beds, and in 1912 it comprised 68,037 bushels, valued at $280,344, of which all but 600 bushels were eastern oysters grown from seed or young transplanted from the Atlantic coast. There is also a growing trade in eastern oysters brought into the State for direct consumption. In Oregon the oyster fishery is negligible, but in Washington in 1912 it produced 143,329 bushels, valued at $386,849. Of these all but 55,736 bushels of native seed oysters, valued at $14,813, were grown on private beds, and most of the value was contributed by the native oyster.

With the completion of these canvasses it is possible to furnish statistics of the oyster industry as a whole by combining the sectional data for the different years. The total number of persons engaged in the oyster industry of the entire United States was 67,257, with yearly wages amounting to $10,876,801, and the capital invested, excluding the value of the private beds, was $16,880,032. The yield

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of oysters was 32,988,815 bushels, valued at $15,377,983, about 46 per cent of the quantity and 65 per cent of the value being the product of private planted beds. In the New England States 93 per cent, in New York 86 per cent, and on the Pacific coast 73 per cent of the product are derived from planted beds, and the relative value of the oysters per bushel increases with the increased importance of planting.

Virginia produces more oysters than any other State, but New York, most of whose natural beds are practically extinct, ranks first in value of its product. Maryland, which has the greatest area of natural beds, occupies second place as to quantity and third as to value, her position being due to the practical nonexistence as yet of oyster culture within her borders.

New England vessel fisheries.—The usual statistics of the vessel fisheries on the high seas conducted out of Boston and Gloucester, Mass., were collated and published as timely monthly and annual bulletins. In 1912 there were landed at Boston 3,676 fares of fish, aggregating 100,300,080 pounds and valued at $2,731,391, and at Gloucester 3,973 fares, weighing 82,403,979 pounds and valued at $2,047,868. The receipts at Boston were all fresh fish, with the exception of 143,000 pounds of salt mackerel, valued at $9,442, and those at Gloucester consisted of 51,263,695 pounds of fresh fish, with a value of $1,055,295, and 31,140,284 pounds of salted fish, valued at $992,573. The total receipts at both ports were 7,649 fares, of 182,704,059 pounds, valued at $4,779,259. Compared with 1911 there was an increase of 849 fares, but a decrease of 2,449,308 pounds in the quantity and $245,238 in the value of the catch. Sixty-eight per cent of the quantity and 64 per cent of the value yielded by the vessel fisheries of the two ports were from the fishing grounds adjacent to the coast of the United States; 12 per cent each of the quantity and value were derived from grounds off Newfoundland; 20 per cent of the weight and 23 per cent of the value were yielded by the grounds off the Canadian Provinces, and less than 1 per cent of the quantity and a little over 1 per cent of the value resulted from the fishery on the coasts of Greenland and Labrador.

There were produced 53,705,128 pounds of cod, valued at $1,674,033; 63,547,230 pounds of haddock, valued at $1,337,326; 15,889,952 pounds of herring, valued at $353,032; 3,541,539 pounds of halibut, valued at $347,250; 4,208,240 pounds of mackerel, valued at $268,338; 15,558,431 pounds of hake, valued at $255,053, and 14,666,662 pounds of pollock, valued at $243,126. The remainder consisted of cusk, swordfish, and miscellaneous species.

The product of the mackerel fishery in 1912 was 31,861 barrels fresh and 8,267 barrels salted, against 43,541 and 6,633 barrels, respectively, in the previous year. The quantity landed at Boston

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was 2,496,620 pounds of fresh fish, valued at $148,496, and 143,000 pounds salted, valued at $9,442, and at Gloucester 163,620 pounds fresh and 1,405,000 pounds salted, the values being $9,390 and $101,010, respectively. In 1913 the catch of fresh mackerel to July 1 was 22,837 barrels, about double that of the preceding year, and 1,523 barrels of salt mackerel were taken to that date. Mackerel were scarce on the southern grounds in the spring, but the fishery on the Cape shore was successful, notwithstanding that the fleet was late in arriving on the grounds.

The herring fishery on the Newfoundland shore in 1912–13 was prosecuted by 42 vessels, of which 6 made two trips. The fish were obtained at Bay of Islands and Bonne Bay and consisted of 47,184 barrels salted and 10,609 barrels frozen, a total of 13,163,776 pounds.

The otter-trawl fishery out of Boston, which is conducted by a single company, has been under investigation by the Bureau in consequence of the opposition which it has excited among the line-trawl fishermen and others interested in the fisheries, and the information acquired will be the subject of a special report. The fishery during the fiscal year employed regularly 6 steamers and occasionally 7. Since July 1, 1913, three new steamers have been added to the fleet. During the calendar year 1912 these vessels landed at Boston over 16,000,000 pounds of fish, of which 14,000,000 pounds were haddock. The fishery is confined chiefly to Georges Bank and adjacent grounds, but in March, 1913, for the first time since the inception of the fishery, it was necessary to resort elsewhere, owing to the scarcity of fish, and several trips were made to Western Bank.

About 1910 an innovation was introduced in the Gloucester, Mass., fisheries by employing for the capture of haddock, cod, and pollock the type of vessels and gill nets employed on the Great Lakes. The results were satisfactory, and in 1911 about 20 vessels were employed; in the fiscal year 1913 the fleet had increased to 38 vessels. The nets differ in details from those formerly, and to some extent at present, employed in the cod fishery, and instead of being fished from dories are set and hauled by the vessels, which are driven by gasoline or other engines, thus permitting the fishing of strings averaging in length between 2½ and 3 miles. The fishery of late has been carried on principally on banks between 8 and 12 miles from shore, although in preceding years it was prosecuted nearer the coast.

Pacific coast fisheries.—The salmon fisheries of the Pacific coast were prosperous in 1912, but the pack as a whole, notwithstanding an increase in Alaska, fell short of that of the preceding year. The purse-seine salmon fishery in the Puget Sound region employed 170 boats, compared with 136 in the preceding year. The halibut catch was approximately 35,000,000 pounds, about the same as in the preceding year, but it was marketed at higher prices. The cod fishery

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was carried on by 7 firms, employing 13 vessels, of which 8 sailed from San Francisco and 5 from Puget Sound ports. The catch for the year was about 9,300,000 pounds.

ALASKA FISHERIES AND FUR RESOURCES.

Owing to the season at which the fisheries of Alaska are conducted and the difficulty of communication, complete returns are not obtainable until late in the fall and it is necessary, therefore, to present data for the calendar year 1912 and not for the fiscal year ended June 30, 1913.

Alaska Salmon Service.—There has been the usual inspection of fishing grounds, apparatus, and methods, and so far as could be determined by the field agents of the Bureau the fishery laws and regulations have been generally well received and respected, although the territory is so vast, communication so difficult, and the agents so few that many regions were not visited.

Under authority of the order of the Secretary, dated March 21, 1912, permitting restricted fishing in reserved waters by natives of Afognak Reservation, 93 permits were issued. The eruption of Katmai Volcano, to which reference has already been made, interfered with the fishery, and but 175,000 salmon were taken, including 17,000 handled at the hatchery.

There was an unusually heavy run of salmon on the south side of Bristol Bay, and the pack was 40 per cent greater than in 1911. In central Alaska and Bering Sea the run of humpback salmon was large, but there was a falling off in southeast Alaska. In the latter locality the run of red salmon was about normal, but in the Nushagak region and in central Alaska there was a shortage, resulting in an increased pack of inferior species; 16,963,000 more salmon were caught in 1912 than in 1911 and the value of the product increased more than $2,000,000. The total catch of salmon was 60,938,945, from which were prepared 4,056,021 cases of canned fish, valued at $16,295,490, in addition to minor products to the value of $837,652. The canneries numbered 87, compared with 64 in the preceding year.

In 1912 the Government and private hatcheries took 167,109,470 red-salmon eggs, a decrease of 102,557,330 (most of it in the private hatcheries) compared with 1911. Under the provision of law exempting from taxation the output of salmon canneries which maintain hatcheries, at the rate of 10 cases of salmon for each 1,000 red or king salmon fry liberated, the tax rebates allowed amounted to $61,744.

The salmon ascending Wood River to spawn were again counted, the results, compared with those of 1908, showing a serious condition, the catch in the Nushagak region during the five-year interval

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having decreased 37 per cent, while the number escaping to the spawning beds fell off 87 per cent.

Other fisheries and their development.—The usual statistical canvass of the Alaska fisheries as a whole showed that 24,263 persons were engaged, the investment was $38,263,457, and the products were valued at $18,877,480.

There is a growing appreciation of the value of marine products formerly regarded as useless, and a number of small plants have been established to utilize them. As yet, however, but a small part of the available aquatic plants and animals have been used, notwithstanding that many of them possess high economic value. Their qualities are unknown to the public, methods of preparation are yet to be developed, and markets for them remain to be established. That these potential resources may be made known and developed it is urgently needed that there be established on the Alaska coast a properly equipped station for purposes of experiment and investigation.

Fur-Seal Service.—The treaty making pelagic sealing unlawful went into effect December 15, 1911, and the season of 1912 was the first for many years in which the seal herd has not been subject to the ravages of pelagic sealers. It is estimated that this resulted in the increase of the herd by about 30,000 seals above the number which would have been on the islands had the destruction at sea continued. A census of the herd made in 1912, under conditions which for the first time permitted an actual count of the majority of the animals, showed that there were about 215,940 seals of all classes. A census made in the summer of 1913 after the close of the fiscal year showed 268,305 seals of all classes.[a]

I have limited to 3,000 the number of seals to be killed during the calendar year 1913 for the food of the natives on the Pribilof Islands. It is probable that a smaller number will suffice.

The sealing operations on the Pribilof Islands during the season of 1912 were again under the direct control of the Bureau's agents. There were sold at auction in London, January 17, 1913, by Messrs. C. M. Lampson & Co., as agents for the Government, 2,880 skins from St. Paul Island and 884 from St. George Island, together with 9 of the previous season which had been sent to Washington for experiment, a total of 3,773 skins. The net proceeds which were covered into the Treasury were $130,640.57. Under the leasing system in force prior to 1910 the Government would have received but $38,589.25 for these skins.

Minor fur-bearing animals.—The take of fox pelts on the Pribilof Islands during the winter of 1911–12 consisted of 384 blue and 29

[a] The Department is informed that a separate census, taken during the summer of 1913 by representatives of the Committee on Expenditures in the Department of Commerce of the House of Representatives, sent to the Pribilof Islands for that purpose, showed 190,950 seals of all kinds.

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white skins, which were sold on behalf of the Government, in London, March 7, 1913, for $20,505.17, after the deduction of commissions and other charges. One choice lot of 28 skins from St. Paul Island sold for $131 each. Under the leasing system the Government received nothing for fox skins.

A warden and four deputy wardens established headquarters in the more important fur-producing regions of the mainland of Alaska and were thus not only able to enforce the regulations but to secure specimens and much information relating to the habits of the fur-bearing animals, valuable in bringing the regulations into stricter accord with requirements. These studies resulted in a revision of the regulations, approved by the Department March 26, 1913, the principal changes being (1) the extension of the close season on beavers to November 1, 1918; (2) minor changes in the close seasons for several other fur bearers; (3) the removal of the close season on the black bear, and (4) prohibition of taking or selling unprime skins.

The cooperation established with the governor of Alaska, whereby five of the Alaska game wardens have been appointed special fur wardens in return for the aid rendered by the Bureau's wardens in enforcing the game laws, has continued to operate satisfactorily and for the improvement of the protection accorded fur-bearing animals.

In the early part of 1913 it became impracticable for the governor of Alaska to continue the Bureau's agents as game wardens, but certain of the Territorial wardens continue to enforce the fur laws under an arrangement by which they receive a nominal salary of $10 per month. During the year three convictions were obtained, but the regulations are generally observed and have already caused an improvement in the quality of the skins shipped from Alaska.

A number of permits have been issued authorizing the taking and shipping of various fur-bearing animals, principally foxes, for breeding purposes. Applications for permits for such operations became so frequent as to cause concern in regard to the maintenance of the natural supply of wild stock. The Department decided to issue further permits for the shipment of foxes from Alaska only to bona fide owners or operators of fox ranches and to make such permits applicable only to foxes which had been bred and reared on those ranches. It was also decided to discontinue the issuance of permits authorizing the capture in Alaska of any fur-bearing animal during the close season prescribed for the species concerned. I have also determined to lease for fox raising, to the highest responsible bidders, certain islands in Alaska, and further to encourage the industry, the Department will furnish, under competitive bids, a limited number of breeding foxes from the Government herds on the Pribilof Islands.

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MISCELLANEOUS ACTIVITIES AND RELATIONS OF THE BUREAU.

The Bureau has continued its cooperation with the Department of Agriculture in identifying and examining samples of foreign and domestic fishery products and in other ways furnishing information and advice to the food and drugs board.

During the year 5,610,000 eggs were shipped to foreign countries in response to official requests. Of these 5,000,000 were whitefish sent to British Columbia, 150,000 brook trout and 100,000 steel-head trout to Canada, and the remainder were rainbow trout shipped to Germany, India, and Japan.

A fisheries intelligence service was established at Seattle, Wash., during the year, but owing to the difficulty in securing a competent local agent it has not been as useful as was anticipated.

During the year sworn admissions of breach of the act of June 20, 1906, for the protection of the sponge fisheries were obtained from the masters of a number of sponge diving vessels, who were held for trial and the vessels libeled. They entered bond and were released, and immediately proceeded to the sponge grounds and repeated the offense. The cases have not yet come to trial and the terms of the law are such that no further arrests or seizures can be made unless the offenders again furnish evidence against themselves. As previously recommended, the act should be either amended or repealed, as in its present unenforceable terms it fosters contempt for the law.

In view of the conditions mentioned in the preceding paragraph the Bureau, on request, prepared a bill designed to correct the defects of the present law. This bill was introduced in the Senate and passed early in the fiscal year. When it reached the House, however, opposition to some of its features developed among those interested in the sponge industry and a hearing was held before the Committee on Merchant Marine and Fisheries. No action has been taken by that committee.

Bills providing for the establishment of fish-cultural stations in many parts of the country were introduced in Congress and considered in committee. One in Utah and one in Rhode Island were acted on favorably, and $25,000 was appropriated toward the construction of each.

An act to give effect to the convention between the Governments of the United States, Great Britain, Japan, and Russia for preservation and protection of the fur seals and sea otter which frequent the waters of the North Pacific Ocean, concluded in Washington, July 7, 1911, passed Congress and was approved August 24, 1912. By this act all killing of fur seals on the Pribilof Islands (except for food of natives) is suspended for a period of five years.

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The act to create a legislative assembly in the Territory of Alaska, approved August 24, 1912, particularly excepted authority for the legislature of Alaska to alter, amend, modify, or repeal any laws of the United States applicable to Alaska relative to fish, game, fur seal, or fur-bearing animals.

The Bureau participated in the work of the Permanent International Council for the Exploration of the Sea, and was represented at the annual meeting of the council at Copenhagen in September, 1912. Plans have been made for cooperative investigations of the North Atlantic Ocean in the interests of the fishing industry of both Europe and America.

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BUREAU OF LIGHTHOUSES.

ORGANIZATION.

The United States Lighthouse Service is charged with the establishment and maintenance of aids to navigation, and with all equipment and work incident thereto, on the sea and lake coasts of the United States, on the rivers of the United States, and on the coasts of all other territory under the jurisdiction of the United States with the exception of the Philippine Islands and Panama. The jurisdiction of the Lighthouse Service over rivers not included in tidewater navigation is restricted to such as are specifically authorized by law; these now include practically all the important navigable rivers and lakes of the country.

All the work of establishing and maintaining the aids to navigation under the jurisdiction of the Lighthouse Service is performed directly by the Service through the district organizations, with the exception of a few minor aids which are maintained by contract and with the exception of the American Samoan Islands and Guantanamo Bay, Cuba, where the aids are maintained through the local authorities. The Lighthouse Service also has supervision over the establishment and maintenance of private aids to navigation.

The office in Washington, which is the executive center of the Service, is under the Commissioner of Lighthouses and the Deputy Commissioner. There are in this office an engineering construction division, under the Chief Constructing Engineer; a naval construction division, under the Superintendent of Naval Construction; a hydrographic division, under an assistant engineer, and the general office force, under the chief clerk.

The Service outside of Washington is divided into 19 lighthouse districts, each of which is under the charge of a lighthouse inspector. In each district there is a central office at a location selected on account of either its maritime importance or its geographical position, and there are also one or more lighthouse depots located conveniently for carrying on the work of the district in the matter of storing and distributing supplies and apparatus. Each district is provided with one or more lighthouse tenders for the purpose of distributing supplies to the various stations and light vessels and for transporting materials for construction or repair, for the placing and care of the buoyage system in the district, and for transporting the

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inspector and other officers of the Service on official inspections of stations and vessels and on other official duty.

In addition to the several district depots, there is in the third lighthouse district, on Staten Island, New York Harbor, a general lighthouse depot, where many of the supplies for the whole Service are purchased and stored and sent out for distribution, where much of the special apparatus of the Service is manufactured or repaired, and where also there is carried on various technical work in the way of testing apparatus and supplies and designing or improving apparatus.

On June 30, 1913, there were 5,536 persons employed in the Lighthouse Service, including 86 in the technical force, 146 in the clerical and office force, and 5,304 employees connected with depots, lighthouses, and vessels.

ADMINISTRATION METHODS AND ECONOMIES.

During the year systematic inspections have been continued in the various lighthouse districts by the general inspector as respects the technical work and vessels and by the examiner as to business methods, property accounts, and clerical organization. The effects of this work have been of great value in maintaining the vessels and other equipment of the Service to a proper standard, systematizing methods in the district organizations, auditing district property accounts, and examining records.

The standard method of cost keeping has been continued throughout the year, and reports have been received which indicate itemized costs of various depots or aids to navigation, as well as office and other overhead expenses. This information will continue to be of increasing value as it is compiled from year to year.

Further improvements have been made in the publication of light and buoy lists during the year, the light lists being designed for the general use of navigators and the buoy lists being for local and service use.

A special disbursing agent has been appointed in each lighthouse district in order to insure expeditious payment to creditors of the Service, with satisfactory results.

Under authority of the act of June 27, 1912, an arrangement was made with the Navy Department for the purchase of crews' uniform clothing from naval stores by this Department, to be sold to the employees of the Lighthouse Service, and the appropriations reimbursed as provided for by law.

In making requisitions on the general depot for supplies and other articles needed in the Service a new method of charging the amount of such requisition to the district making the request, accompanied

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by an automatic transfer of funds, has been put into operation. The former practice was to provide the general depot with sufficient funds to meet all requests and not to charge the cost to the districts making such requests, which in some cases resulted in larger requisitions being made than were immediately necessary, and it is believed that a considerable economy has been effected by the establishment of this new method.

Commutation of subsistence on lighthouse vessels, authorized by the act of August 24, 1912, was put into effect on a number of tenders shortly after the passage of the act, and has proven successful in reducing office work in the preparation of proposals and other papers for subsistence supplies. It has also been conducive to the comfort and satisfaction of the complements of vessels. It is now being extended to light vessels under proper restrictions as to reserve provisions.

A new schedule of complements and rates of pay for officers and crews of light vessels was put into effect during the year. This was a part of the general reorganization of the Lighthouse Service contemplated by the act of June 17, 1910, and has had the effect of standardizing the pay scale for different types of vessels and stations.

Revision was made of the schedule of officers of tenders, under which there were authorized 16 second officers and 9 second assistant engineers for certain tenders where the needs of the Service require a licensed officer who may be placed in charge of the vessel or its machinery, 4 positions each of cadet officer and cadet engineer for the Atlantic coast and Lake districts, and 1 position each of cadet officer and cadet engineer for the Pacific coast districts. These positions are in the Lighthouse Service at large, in order that these cadet officers and cadet engineers may be transferred as their services may be required, thus giving young men who enter the Service in these positions a varied experience in lighthouse-vessel work and fitting them for more responsible duties.

The Department has submitted for the consideration of Congress an estimate to increase the appropriation for salaries, lighthouse vessels, in order that more adequate pay may be given to the crews of lighthouse vessels. There has been increasing difficulty in obtaining competent seamen and others of crews for such vessels in recent years, and as a result lighthouse tenders engaged in important buoy work during the past season have not been able in some cases to maintain full crews or have had their crews made up largely of inexperienced men. This condition is believed to be due to the fact that the pay of these crews, and particularly of the seamen, has not been increased for a number of years, whereas pay in other Government services and in the merchant marine generally has been raised. For

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instance, the pay of seamen in the Revenue-Cutter Service on the Atlantic coast was increased by 20 per cent five years ago and is now that much higher than the similar pay in the Lighthouse Service, and, in addition, such seamen receive an allowance for uniforms and for reenlistment. The work of seamen on tenders of the Lighthouse Service is unusually severe, and thoroughly competent men are required to render these vessels efficient on the important work in which they are engaged.

New regulations for shore liberty and annual leave for keepers of light stations and officers and crews of light vessels were put into effect during the fiscal year. These provide for a maximum of shore liberty and leave of 72 days a year for keepers and 90 days a year for crews of light vessels. Regulations providing for leave of absence for crews of tenders were also issued.

Authority has been granted to allow to members of crews who are sick in hospitals, and who have served on a lighthouse vessel for at least one year preceding the date of entrance into the hospital, pay for not exceeding 60 days of the confinement in hospital, provided such members of crews return to duty and serve for two months or more thereafter.

New log books for vessels were issued which provide for recording the necessary information in a more systematic and compact form.

Regulations providing for a systematic method of advertising proposals for furnishing materials, services, or supplies, through newspapers and otherwise, were issued during the year.

A drawing showing the various types of buoys used by the Lighthouse Service was issued, for the assistance of officers of lighthouse tenders charged with the work of relieving and establishing such aids.

Instructions for the operation of different types of gas buoys were issued.

Inspectors are required to report annually the description and condition of all spare property or equipment on hand in their districts. These reports are then consolidated and distributed to the various districts in order that an economical exchange or transfer of such equipment not needed by one district but perhaps by another may be effected.

The application of the parcel-post law to the Lighthouse Service has considerably facilitated the shipping of various small articles required from time to time at stations and on vessels.

Cards giving general rules as to the admission of visitors have been printed for posting at light stations. The keeper of the Absecon Light Station, at Atlantic City, N. J., reported that during the three months ended September 30, 1912, 10,339 visitors registered at the station. This station is visited probably more than any other light station in the United States.

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During the year an inquiry was made concerning the extent, accessibility, and historical nature and value of all archives of the Lighthouse Service up to the year 1873.

New civil-service regulations for the Lighthouse Service were published.

There were issued new regulations prescribing uniforms for officers and crews of vessels of the Lighthouse Service.

COOPERATION.

Special effort has been continued to consult the needs of maritime interests as to aids to navigation and to cooperate with other branches of the Government having interest in or relations with the work of this Service.

Cooperation with the engineer officers in charge of river improvements in the river districts has been continued, and has proven particularly advantageous in the prompt change of aids when needed by engineer vessels in the vicinity, making it unnecessary to await the arrival of the lighthouse tender. Altered channel conditions and the adjustment of aids at the opening of navigation in the spring are thereby handled more expeditiously than in former years.

Arrangements were made with the Navy Department and the Revenue-Cutter Service for making prompt report directly to the nearest lighthouse inspector concerned of any deficiencies observed in aids to navigation.

A joint regulation approved by the War Department and the Department of Commerce providing for the marking of wrecks and making arrangements for the removal of same was issued. Arrangements were also made for general cooperation with the Revenue-Cutter Service and the Office of the Chief of Engineers, War Department, for the removal of wrecks, derelicts, and other obstructions to navigation. The commanding officers of revenue cutters will promptly notify the nearest lighthouse inspector whenever wrecks are buoyed or lighted by vessels of the Revenue-Cutter Service, in order that such information may be published in the weekly Notice to Mariners.

LEGISLATION AFFECTING THE LIGHTHOUSE SERVICE.

In addition to the maintenance appropriations for the current fiscal year, appropriations for the following special works have been made since the close of the year: Depot for the sixth lighthouse district, $125,000; aids to navigation in Atchafalaya Entrance Channel, La., $50,000; light vessel for the Southwest Pass Entrance to the Mississippi River, La., $125,000; light station on Navassa Island, West

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Indies, $125,000; improvement of aids to navigation at Ashtabula Harbor, Ohio, $45,000; improvement of fog-signal station at Cleveland, Ohio, $17,600; light and fog-signal station and improvement of aids to navigation at Lorain Harbor, Ohio, $35,000; aids to navigation at Ashland, Wis., $25,000; pierhead light and lighted buoy at Oconto Harbor, Wis., $5,000; aids to navigation in Manistique Harbor, Mich., $20,000; light and fog signal at or near Cape St. Elias, Alaska, $115,000; aids to navigation and improvement of existing aids in Puget Sound and adjacent waters, Wash., $30,000; improvement of Warrior Rock Light Station, Oreg., $2,000; completion of unfinished portion of Government road from Rollerville to the Point Arena Lighthouse, Cal., $3,000.

The following works were authorized at the limits of cost specified, no appropriations being made: Lighthouse tender for general service, $250,000; light vessel to be placed near Monhegan Island, Me., $125,000; carpenter shop at the general lighthouse depot, Tompkinsville, N. Y., $23,000; light and fog-signal station at or near North Farallon Island, Cal., $100,000.

The use of the unexpended balance of the appropriation of $15,000 heretofore made for a light and fog-signal station at or near the west end of the draw near the Lehigh Valley Railroad bridge at Passaic, N. J., for establishing beacon lights to mark the channel in Newark Bay, N. J., was authorized.

The purchase for lighthouse purposes of approximately one-half acre of land in the vicinity of the lighthouse reservation at Port Ferro Light Station, P. R., for the purpose of constructing a watershed and cistern, and making the appropriation "General expenses, Lighthouse Service," for the fiscal year in which the purchase is effected available therefor, was authorized.

The purchase of necessary additional land for light stations and depots, under rules prescribed by the Secretary of Commerce, was authorized, no single acquisition of such additional land to cost in excess of $500. Authority was later given for the payment for such land to be made from the appropriation "General expenses, Lighthouse Service," and the total sum to be expended for this purpose in any fiscal year restricted to $3,000.

Authority was granted for the furnishing of supplies and equipment for special works of the Lighthouse Service from general stock, and the reimbursement of the appropriation "General expenses, Lighthouse Service," from the respective appropriations for special works.

Authority was granted for the appraisal and sale, either by sealed proposals for the purchase of the same or by public auction, after advertisement of the sale for such time as in the judgment of the Secretary of Commerce the public interests require, of any con-

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demned supplies, materials, equipment, or land which can not be profitably used in the work of the Lighthouse Service, the proceeds of such sales, after the payment therefrom of the expenses of making the sales, to be deposited and covered into the Treasury as miscellaneous receipts, as now provided by law in like cases.

Authority was granted for the payment of $1,642.55 to the officers and crew of the tender *Manzanita* for personal-property losses sustained by them on the foundering of that tender on October 6, 1905.

Authority was given to pay a claim in the sum of $22.50 for damages occasioned by a collision for which a vessel of the Lighthouse Service was found to be responsible.

APPROPRIATIONS.

The estimates for maintenance appropriations for the year 1914 were divided into one appropriation for general expenses of supplies, repairs, etc., and three appropriations for salaries, with an alternative providing for all maintenance appropriations in a single item. This alternative proposition was not authorized by Congress. It is believed, however, that with this form of appropriation a more economical and efficient administration of the Lighthouse Service could be effected, and in the estimates for the next fiscal year attention has been drawn to the fact.

Besides the estimates for maintenance, estimates for 29 special works have been submitted aggregating $1,635,500. These include 3 new lighthouse tenders, 1 new light vessel, 3 new light and fog-signal stations, 2 new light stations, 1 new lighthouse depot, 5 items for establishing or improving aids in general localities, 1 item for a new system of harbor or channel lights and other aids, 8 items for improvements of light or fog-signal stations or of groups of aids to navigation, 4 items for improvement of lighthouse depots, and 1 item for light keepers' dwellings.

AIDS TO NAVIGATION.

During the fiscal year ended June 30, 1913, there was a net increase of 591 in the total number of aids to navigation maintained by the Lighthouse Service, including 2 light vessels, 56 lights above the order of minor lights, 10 fog signals, 3 submarine bells, 171 daymarks, 51 lighted buoys, 184 unlighted buoys, and 114 minor lights.

Fixed lights were changed to flashing or occulting at 26 stations. The illuminant of 73 lights was changed to incandescent oil vapor, and the illuminant of 30 lights was changed to acetylene. Two new light vessels were established during the year. On June 30, 1913, there were maintained by the Lighthouse Service 13,434 aids to navigation, including 4,739 lights of all classes and 566 fog signals, of which 46 are submarine signals.

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Following are some of the more important aids which have been established or materially improved during the past fiscal year:

Second order incandescent oil-vapor light established: Kilauea Point, Kauai Island, Hawaii, about 250,000 candlepower.

Fourth order incandescent oil-vapor lights established: Miah Maull Shoal, N. J.; San Pedro Breakwater, Cal.; Alki Point, Wash.; Superior Entry South Breakwater, Wis.

New light vessels placed on station: Milwaukee *No. 95*, Wis.; Buffalo *No. 96*, N. Y.

South Pass Light Vessel *No. 43*, La.: Moved to Southwest Pass, Mississippi River.

Bush Bluff Light Vessel *No. 97*, Va.: Changed to flashing electric light.

First-class air sirens established: Point Loma, Cal.; San Pedro Breakwater, Cal.

Reed-horn fog signal established: Alki Point, Wash.

Fog bell established: Negro Point, N. Y.

Submarine fog bell established: Off Whitefish Point, Mich.; on Buffalo Light Vessel *No. 96*, entrance to Buffalo Harbor, N. Y.

A gas, whistling and submarine bell buoy was established at Orford Reef, Oreg.

Other important gas buoys established: Block Island North Reef, N. Y. (bell); Chesapeake Bay entrance, Va.; Neah Bay, Wash. (whistle); South Pass, Mississippi River, La. (whistle); Columbia River entrance, Oreg.-Wash. (2 buoys, 1 with whistle); Joe Flogger Shoal, Delaware Bay, Del. (bell); Boulder Reef, Lake Michigan.

Systems of minor aids and buoyage extensively rearranged or improved in important harbors: Boston Harbor, Mass.; Nantucket Sound, Mass.; Connecticut River, Conn.; Ambrose Channel, N. Y.; Delaware Bay and River, Del., N. J., and Pa.; Baltimore Harbor, Md.; Hampton Roads, Va.; Newport News, Va.; Tybee Roads, Ga.; St. Johns River, Fla.; Key West Harbor, Fla.; Tampa Bay, Fla.; Mobile Bay, Ala.; Sabine Pass, Tex.; Niagara River, N. Y.; Maumee Bay and River, Ohio; Detroit River, Mich.; Columbia River, Oreg.-Wash.

Flashing acetylene lights established: Blank Island, Spanish Island, Sukoi Islets, Cape Fanshaw, Shakan Bay, Key Reef, Lone Tree Point, Point Helen, Busby Island, Seal Island, Point Hugh, Grave Point, Lord Rock, Alaska; Milwaukee South Pierhead, Manitowoc South Breakwater, Wis.; Galveston Bay Channel, Tex.; Reeds Hammock, N. C.; Cape Fear River, N. C. (10 lights); Negro Point, N. Y.; Livingstone Channel, Detroit River, Mich. (6 lights).

The mildness of the past winter has permitted keeping on station many gas buoys which ordinarily are removed during the season of heavy ice. In the Delaware River and Bay, for the first time since

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gas buoys were established there, half of the gas buoys were maintained on station throughout the winter.

Measures have been taken for improvement in the marking of light-vessel stations for the purpose of lessening the danger of an approaching ship mistaking one light vessel for another. The names of light vessels have been simplified, thus permitting the distinguishing word for the vessel to be painted in larger letters, which can be read at a much greater distance. In every case the important distinguishing word has been retained on the vessel, so that there is no difficulty in the mariner identifying the station. These recent improvements made to avoid danger in confusing relief light vessels consist in assigning code-signal letters to every light-vessel station and having the relief lightship display the code-signal letters of the station to approaching vessels whenever necessary to warn them of the name of the station, and also in having the relief vessel so equipped that at night she can show the identical light of the station ship, and during fog sound the identical fog signal; also the relief vessel will sound the same code number on the submarine bell. To avoid confusion when light vessels are off their stations while proceeding to or from port, all light vessels have been directed, under such circumstances, to show the international code-signal letters "QE," meaning lightship is not at anchor on her station.

The practice has been inaugurated of publishing from time to time special poster notices to mariners for the more important changes in aids to navigation. It is intended that these notices be displayed in such offices and places as are frequented by mariners, in order to bring important changes prominently to their attention. When practicable six months' advance notice is given of all important changes in seacoast aids, and the notice is repeated in the weekly Notice to Mariners in the first issue of each month until the change is carried into effect. The mailing list for notices is revised from time to time with a view of obtaining the maximum publicity for all changes.

Regulations issued during the year for standard-size buoy letters and numbers have had the effect of producing general uniformity in this system of marking throughout the Service.

Arrangements have been made with the United States naval radio station at Arlington, Va., to send by wireless twice a day to shipping along the Atlantic coast important emergency information regarding aids to navigation.

A board, consisting of engineer officers of the Army and lighthouse inspectors, appointed October 29, 1912, to consider and report upon the most feasible, advantageous, and economical method of providing suitable aids to navigation at or near the extremity of the south jetty at the mouth of the Columbia River, Oreg., recommended a system of buoys and range lights, which have since been established.

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ALASKA.

The total number of aids to navigation in Alaska, including lights, fog signals, buoys, and daymarks, in commission at the close of the fiscal year ended June 30, 1913, was 279, including 93 lights, representing an increase of 56 lights since June 30, 1910, or 150 per cent. The following table, which gives the total number of aids to navigation on June 30 of each year named, illustrates the progress in establishing aids in the Territory:

Aids.	1910	1911	1912	1913
Lights	37	71	85	93
Fog signals	9	10	10	10
Buoys	84	105	132	136
Daymarks	30	29	38	40
Total	160	215	265	279

The work of rebuilding and improving the present light and fog-signal station at Lincoln Rock, under the special appropriation of $25,000 made by the act of March 4, 1911, has been completed.

The act approved March 4, 1913, authorized a light and fog-signal station at or near Cape St. Elias, at a cost not to exceed $115,000, and an appropriation of this amount was made subsequent to the close of the fiscal year.

An estimate for an appropriation of $325,000 for a new tender to replace the *Armeria* will be included in the Department's estimates for the fiscal year 1915, which will also include an item of $60,000 for the establishment of aids to navigation and the improvement of existing aids in Alaska.

ENGINEERING AND CONSTRUCTION.

A number of new works under special appropriations were completed during the fiscal year. Those of principal importance are as follows: New fog signal at Manana Island, near Monhegan Island, Me.; wharf, power house, and foundry at the general lighthouse depot, Tompkinsville, N. Y.; new light and fog bell at Negro Point, East River, N. Y.; new lighthouse at Miah Maull Shoal, Delaware Bay, N. J.; a portion of new lights for Cape Fear River, N. C.; new lighthouse and fog signal, with minor lights, at Superior Entry, Wis.; beacon lights and buoys for Livingstone Channel, Detroit River, Mich.; 13 new acetylene lights in Alaska; reconstruction of lighthouse and fog signal at Lincoln Rock, Alaska; new light and fog signal, Alki Point, Puget Sound, Wash.; new lighthouse and fog signal at San Pedro Breakwater, Cal.; new fog signal at Point Loma, Cal.; new lighthouse at Kilauea Point, Hawaiian Islands.

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Other important work in progress at the close of the fiscal year includes a new light and fog signal at Thimble Shoal, Chesapeake Bay, Va.; new light and fog signal at Brandywine Shoal, Delaware Bay, N. J.; lights and buoys for channels leading to Baltimore, Md.; general improvements at San Juan Depot, P. R.; new light and fog signal at Buffalo Breakwater North End, N. Y.; and new system of lights (43 in all) for St. Marys River, Mich.

The most noteworthy example of construction accomplished during the fiscal year was the construction of foundations for 10 beacon lights marking the Livingstone Channel, Detroit River, Mich. The concrete foundations of 6 of the beacon lights were constructed in place in the cofferdam built by the engineer officers for the purpose of taking out the principal rock cut, thus avoiding the heavy expense which would have been incurred had it been necessary to place these foundations under water. The remaining four foundations were constructed by building reenforced concrete cribs at a selected point within the cofferdam, afterwards towing them downstream to their proper positions, sinking them by means of sluice valves provided for the purpose, then pumping out the water from the interior of the cribs and filling them with concrete. This also proved to be an economical method of construction. Iron ice guards around the water line are provided for all concrete foundations. Acetylene illumination was provided for the beacon lights.

A new type of cast-iron mast supporting a cylindrical tank shelter, surmounted by an acetylene lantern, has been developed and installed in exposed positions on breakwaters which in times of storm are swept by the sea to a depth of 10 feet. The structures have withstood this test and have given general satisfaction.

Old wooden beacons have been replaced by concrete structures, which have been found superior in resisting ice damage. In one case, where in former years the old wooden rock-filled crib was overturned by ice every winter, a concrete structure has now stood without damage for two years.

Some experimenting and work was done with oil concrete—Portland cement concrete with addition of a paraffin base residue mineral oil—and the results have so far been satisfactory in preventing leakage or absorption.

A tripod beacon was built of reenforced concrete in place of wood, and work on another was nearly completed. A much more durable and permanent construction has been effected, and other beacons of this type will be built in the future.

To lessen possible damage from fire at light stations a number of isolated oil houses have been built during the year for the storage of inflammable supplies.

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A standard legend to be placed on all drawings, tracings, and blue prints made throughout the Service was developed during the year. Standard photolithograph drawings and instructions covering various types of incandescent oil-vapor lamps were issued during the year, to be placed in a proper place for ready reference by keepers and other employees charged with the use of same.

Arrangements were made to provide each district office with a small collection of modern technical reference books for use in designing and other engineering work of the Service.

IMPROVEMENT OF APPARATUS.

Until lately it has been necessary to procure all the cut glass lenses used in the Lighthouse Service from either France, England, or Germany, most of them coming from France. Recently the matter was taken up with an American firm of glass manufacturers with a view to ascertaining if a better lens could not be made in this country than abroad by using some modern manufacturing methods. The results to date have proven satisfactory. The lenses are superior to those purchased abroad and can be made for the same cost or less. The essential feature of the American method of manufacture is that the prisms are formed by machines instead of by hand. Every part is made to fit an accurate template or jig, so that they are true to size and parts of the same number are completely interchangeable. It is hoped that in a short time American factories will be equipped to furnish all lenses except those of large size, for which the demand is too small to warrant the large equipment cost necessary.

Improvements have been made in pressed glass lens lantern and buoy lantern lenses, and tests show them well adapted for many conditions of the Service, at a decrease in expense.

Efforts with a view to the standardization of articles manufactured at the general lighthouse depot, Tompkinsville, N. Y., were continued. Practically all articles manufactured at that depot are now made from jigs and templates, so that all parts are duplicate and interchangeable. The making of proper tools and installation of modern machinery is still in progress, and it is expected to reduce costs of manufacture further.

Wick lamps have been gradually replaced by incandescent oil-vapor installations at a number of important stations, thereby producing a much brighter and more efficient light, which has proven satisfactory to mariners and elicited favorable comments from them.

A device to call the attention of the keeper to any abnormal condition of his light has been prepared and fitted to a third-order vapor lamp. It consists of a recording thermometer with electrical connections to ring alarm bells where required when the light burns

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either too low or too high, and also keeps a chart record showing the operation of the light. Its use tends to greater attention on the part of keepers to insure uniform illumination. Other devices designed for the purpose of summoning the light keeper in case his light is not burning properly are being tried.

Experiments have been made with new types of post lanterns, and a lantern has been developed which it is believed will be an improvement.

Experiments have been made for the improvement of lens clocks or revolving apparatus, and a clock that is believed to be superior is being manufactured.

The use of devices to prevent birds from resting on buoys and discoloring them was extended during the year.

An improved type of torch for starting oil engines was designed.

A vapor lamp using three 55-millimeter mantles was developed, for use in first and second order lenses, that gives promise of operating successfully.

Some improvements were made in the construction of single oil-vapor lamps, in the direction of better control and simplification of cleaning operations.

The question of installing acetylene fog guns for trial at several light stations in this Service is under consideration. These fog guns were tried recently by the Scotch Lighthouse Service with apparently satisfactory results.

VESSELS.

Milwaukee Light Vessel *No. 95*, Wis., has been completed and placed on station.

Contract has been awarded for the construction of light vessels *No. 96* and *No. 98*, the former to be stationed about 13 miles southwest from Buffalo Harbor North Entrance and the latter to be used as a relief vessel on the Great Lakes. Contract has also been awarded since the close of the fiscal year for the single-screw, steam-propelled lighthouse tender *Laurel*, for service in the fifth lighthouse district.

The tender *Woodbine* is still under construction, its completion having been delayed by the failure of the contractor and by delay in the furnishing of the propelling engine. It is expected that the vessel will be ready for service about November, 1913.

Diamond Shoal Light Vessel *No. 71*, N. C., was greatly improved by fitting new boilers, compounding the propelling engine, and replacing one of the steam-driven electric generating sets for the signal light and radio service by an oil-engine outfit of the same capacity. The speed of the vessel has been increased, while the coal consumption has been reduced. A further economy has been effected in the

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avoidance of the dangerous labor of frequently coaling the vessel at sea, as well as in a saving of the time of the tenders and the labor of their crews, as oil is safely and quickly delivered.

Bush Bluff Light Vessel, Va., has recently been fitted with a new system of electrical signal lights. It consists of one parabolic silvered reflector mounted on a compound pendulum and revolved by an electric motor to show a flash every 10 seconds. The light is furnished by a concentrated Tungsten filament incandescent lamp of 30 candlepower, fixed in the focus of the reflector, and gives a flash estimated at about 80,000 candlepower. The current for the operation of both the lamp and motor is furnished by storage batteries, which are sent ashore for recharging at convenient intervals. This is the first installation of a signal light of this character in the world.

Regulations providing for the standard painting of under-water surfaces of Lighthouse Service vessels were issued after a number of experiments and service trials of various compositions. These regulations cover the various conditions under which these vessels must operate, both in salt and fresh water.

Supplementary to these regulations, instructions were also given for the periodic docking of all vessels at regular intervals, depending on type of vessel and locality of station.

SAVING OF LIFE AND PROPERTY.

During the fiscal year 1913 services in saving of life and property were rendered and acts of heroism performed by employees of the Lighthouse Service on vessels or at stations on 92 occasions.

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COAST AND GEODETIC SURVEY.

GEODETIC WORK.

A reconnoissance was made for the extension of the primary triangulation along the ninety-eighth meridian from Alice, Tex., to the Mexican boundary, to connect with the triangulation executed by the Mexican Government. The triangulation of the coast of Louisiana in the vicinity of Cote Blanche and Atchafalaya Bay, and of Laguna Madre, Tex., was revised.

Primary triangulation was extended along the one hundred and fourth meridian from the vicinity of Colorado Springs, Colo., to the Canadian boundary, a distance of 720 miles. A secondary triangulation along the coast of Washington was begun. Precise leveling was completed on the line between San Francisco, Cal., and Brigham, Utah, and was begun on a line between Crookston, Minn., and Butte, Mont.

Determinations were made of the difference of longitude of stations near the one hundred and fourth meridian in Nebraska, Colorado, Wyoming, and Montana.

The geographic positions of numerous aids to navigation and of radio stations along the Atlantic and Pacific coasts were determined.

MAGNETIC WORK.

Observations for magnetic declination, dip, and intensity were made at the magnetic observatories maintained by the Survey at Cheltenham, Md.; Tucson, Ariz.; Vieques, P. R.; Sitka, Alaska, and Honolulu, Hawaii. Seismological and meteorological observations were continued at the observatories and special observations were made in accordance with plans adopted for international cooperation. Magnetic observations were made in the field at a large number of stations in the United States and in the Philippine Islands and meridian lines were established when requested by local authorities.

Magnetic observations at sea and at shore stations were made by vessels engaged in general surveying operations.

HYDROGRAPHIC AND TOPOGRAPHIC WORK.

Atlantic coast.—The steamer *Bache* was engaged in inshore and offshore hydrography between Charleston and Savannah, including St. Andrews and Sapelo Sounds and Tybee and Port Royal entrances, and offshore work between Delaware and Chesapeake Bays.

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The *Bache* was repaired at Boston between September 26 and October 27.

The steamer *Endeavor* was at work on the hydrography of Chesapeake Bay from Kedges Strait northward; in Narragansett Bay, R. I.; between Cowpen Island, Core Inlet, and Morehead City. The vessel was repaired at Baltimore between November 20 and January 2 and at Jersey City, N. J., between May 19 and 24 and June 24 and 30.

The steamer *Hydrographer* was employed on coast-pilot revision between Chesapeake Bay and Kest West, and in detached hydrographic surveys on the coast of Massachusetts and on the coast of North Carolina in the region between Cowpen Island, Core Inlet, and Morehead City. Repairs were made to this vessel at Baltimore between December 21 and January 20 and between June 19 and June 30.

The schooner *Matchless* completed a survey of the Pamunkey River, Va., to the head of navigation and began a survey of the southern and eastern branches of Elizabeth River. The *Matchless* was repaired at Baltimore between July 1 and 23 and between June 26 and 30.

Wire-drag work was done in the channel between Block Island, R. I., and Montauk Point, Long Island, N. Y.; in Buzzards Bay, Mass.; at Key West, Fla., and in the vicinity of Matinicus Island, on the coast of Maine.

A resurvey of the Delaware River from House of Correction Wharf to Trenton was completed and a survey of Newark Bay and the Hackensack and Passaic Rivers was begun.

Chart-revision work, including revision of shore-line changes, improvements, and additions, was continued in the vicinity of New York City and on Long Island Sound eastward from Stamford, Conn., and on the coasts of Maine and Massachusetts, and a survey was made of the dredged channel between Greater and Little Peconic Bays, N. Y. Preparations were begun at the close of the year for a series of current observations in the Potomac River.

Data were collected for the preparation of an inside-route pilot from Cape Sable, Fla., to New Orleans, La.

A hydrographic survey of Piscataqua River and Great Bay, N. H., was begun.

An officer of the Survey performed the duties of inspector during the year for the region from Narragansett Bay to Delaware Bay, inclusive. Information was obtained by this officer for chart corrections and notices to mariners, and data relating to charts, tides, and sailing directions were supplied to navigators and others interested. A revision was made of the shore line of Hog Island and portions of Rhode Island and Bristol Island and of the channels in the vicinity of Hog Island Shoal Light, R. I. The supervision of the construction of certain boats for the use of the Survey and of machinery and

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boilers for the same and the collection of data relating to depths in channels and harbors are among the various duties performed by this officer, whose headquarters are at the New York customhouse.

Pacific coast.—The steamer *Explorer* was employed on the survey of the entrance of the Kuskokwim River, Alaska. The *Explorer* was repaired at Seattle and at the Puget Sound Navy Yard between January 20 and the early part of April, and afterwards a radio apparatus was installed on the vessel.

The party on the steamer *Gedney* was engaged in surveys in Kasook Inlet, Sukkwan Strait, Tlevak Strait, and San Cristoval Channel, Alaska, and in revision work at Tacoma, Olympia, and Seattle, Wash. The vessel was repaired at Winslow, Wash., between February 24 and April 4.

The steamer *McArthur* made hydrographic surveys in Cook Inlet in the vicinity of Aialik Bay and offshore between Aialik and Resurrection Bays; at Nakat Harbor, Burnett Inlet, and Iniskin Bay, Alaska. The *McArthur* was repaired at the Puget Sound Navy Yard between February 19 and April 15.

The steamer *Patterson* was employed in southeastern Alaska on the triangulation and topography of Clarence Strait and on surveys in the vicinity of the Shumagin Islands and Unimak Pass. During the winter the vessel was engaged in hydrographic work around the Island of Maui and off the west end of Molokai Island, Hawaiian Islands. Temperatures of sea water were obtained both in going to Hawaii and in returning. The *Patterson* was repaired at Seattle between July 1 and August 2 and in November and May. In May a radio apparatus was installed on the vessel.

The steamer *Taku* operated in the northwestern part of Prince William Sound between Naked Island and Port Wells and in the north arm of Simpson Bay and thence southward toward Knights Island Passage and westward from previous work on the mainland. The *Taku* was repaired at Cordova, Alaska, between April 2 and May 1.

The steamer *Yukon* was employed on the survey of Turnagain Arm, Cook Inlet, and in the approaches to the Kuskokwim River, Alaska. The *Yukon* was repaired at Seldovia between April 23 and May 10.

Revision work for the correction of charts was done at Blaine, Bellingham, Anacortes, Neah Bay, Port Angeles, Port Townsend, Richmond Beach, and Coupeville, on Puget Sound.

The revision of the triangulation and topography of the Island of Maui was completed and that of the Island of Hawaii was begun. The work was carried from Hilo around the northwest point of the island to Kawaihae.

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An officer of the Survey continued in charge of the suboffice at San Francisco, acting as inspector for the coast of California. A resurvey was made under his direction of the United States immigration station on Angel Island, San Francisco Bay.

An officer, acting as inspector for the coasts of Oregon, Washington, and Alaska, stationed at Seattle, in addition to other duties, rendered valuable service in the preparation of specifications for repairs of vessels and of plans for a new launch for the steamer *Pathfinder*, in planning work for vessels in Alaska, and in collecting and furnishing information useful to navigators and for the correction of charts.

TIDES AND CURRENTS.

Tide observations were continued at regular stations maintained at Portland, Me.; Fort Hamilton, N. Y.; Atlantic City, N. J.; Philadelphia, Pa.; Baltimore, Md.; Fernandina, Fla.; Galveston, Tex.; San Diego, Cal.; San Francisco, Cal.; Seattle, Wash., and Juneau, Alaska, and at stations temporarily occupied in connection with hydrographic work. The tidal indicators at Fort Hamilton, N. Y.; New York City, and Reedy Island, Delaware River, were continued in operation.

Current observations were made in various localities by vessels of the Survey, and through cooperation with the Bureau of Lighthouses by observers on light vessels along the Atlantic coast.

SPECIAL SURVEYS.

Many requests were received for special surveys in various localities. Reports of newly reported dangers to navigation were promptly investigated and when verified were made the basis of chart corrections and notices to mariners.

OUTLYING TERRITORY.

An officer of the Survey detailed to duty as director of coast surveys, with headquarters at Manila, has direction of the field work in the Philippine Islands. Excepting the steamer *Pathfinder*, the vessels engaged in that work are the property of the insular government, which provides the crews and keeps the vessels in repair. The salaries of the officers are paid by the Federal Government and the running expenses, including outfit, are divided between the Federal and insular governments.

Congress having made an appropriation for extraordinary repairs to the *Pathfinder*, that vessel was taken to Hongkong in December. The extensive repairs needed were completed by April 8, when the

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vessel returned to Manila. The *Pathfinder* encountered several typhoons during the year, the most severe of which occurred on October 16, when she was lying at Cebu. Both of her launches were dragged from their moorings and swamped. One was recovered without serious damage; the other was lost.

On November 6 the steamer *Marinduque*, during a typhoon, was driven on shore and seriously damaged, necessitating extensive repairs.

The general localities in which the vessels were employed are as follows: The steamer *Pathfinder* was employed in general surveys on the southeast coast of Mindanao and the southwest coast of Negros; the steamer *Fathomer* was employed on general surveys in the vicinity of the Cuyos Islands and Apo Reef, Busuanga Island, and between the Cuyos Islands and Palawan; the steamer *Marinduque* was engaged in general surveys in Ragay Gulf, southwestern Luzon, on the west coast of Mindanao, and on the west coast of Mindoro; the steamer *Romblon* was at work in the area bounded by Luzon, Burias, Masbate, and Tablas Islands, in the vicinity of the Lubang Islands and the Calamianes Group, and the steamer *Research* made surveys in the area bounded by Samar, Leyte, Biliran, and Masbate Islands.

Tidal observations were made in connection with the work of the hydrographic parties.

Magnetic observations were made at a number of stations in the Philippine Islands.

In the Hawaiian Islands triangulation and topographic and hydrographic surveys were continued, and the usual observations were made at the permanent magnetic observatory maintained by the Coast and Geodetic Survey at Honolulu.

Through the courtesy of the surveyor general of Hawaii tide observations made by the Territorial government are furnished to the Coast and Geodetic Survey.

A permanent magnetic observatory is maintained by the Survey at Vieques, P. R.

INTERNATIONAL BOUNDARIES.

The Superintendent is commissioner on the part of the United States for the survey and demarcation of the boundary line (excepting certain water boundaries) between the United States and Canada and between Alaska and Canada, and the field work is conducted by parties under his direction. The expenses of the work are defrayed from a special appropriation made to the State Department.

United States and Canada boundary.—During the fiscal year the following work was completed:

On the boundary east of the summit of the Rocky Mountains between the Red River of the North and Lake of the Woods 95 miles of

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topography along the boundary were completed, 82 miles of vista were cut, 102 miles of boundary were located, and 155.5 miles of levels were run. The triangulation was extended along the boundary for a distance of 87 miles, and the triangulation of the Lake of the Woods was completed. A base line was measured at Fort Frances, Ontario. Seventy-five monuments were set on the boundary. The meridian boundary to its intersection with the southeast boundary was located and marked.

Twenty-five miles of triangulation on the Lake of the Woods were done by a Canadian party, to which an American surveyor was attached, and a hydrographic survey of the lake along the boundary was made.

Between Pigeon River and Lake of the Woods triangulation and topography were completed from Round Lake to a point beyond the western end of Knife Lake, a distance of about 41½ miles.

On the northeastern boundary between Maine and New Brunswick 31.5 miles of boundary were measured, 37 miles of levels were run, and 42.39 square miles of topography were completed. A lane 30 feet in width was cut through the dense forest along this portion of the boundary. In the valley of the St. Croix River 18 square miles of triangulation and 2 square miles of topography were completed and reference marks were placed on Monument Stream.

Alaska boundary.—The line tracing of the one hundred and forty-first meridian boundary was completed from the close of the previous work to the shores of the Arctic Ocean, a distance of 22 miles. The triangulation was carried for a distance of 51 miles to the ocean shore and extended eastward for 25 miles to determine the relation of the terminal monument to the shore line. The topography along the boundary was surveyed for a distance of 49 miles and extended along the ocean shore to include Icy Reef, Beaufort Bay, and Demarcation Point to the west and Clarence Bay to the east. Vista cutting and stadia measurement were also completed, covering a distance along the boundary of 91 miles. Fifty-six monuments were placed on the boundary north of the Porcupine River to the Arctic, covering a distance of 80 miles, and south of the Porcupine, 78 miles.

In the region south of Mount Natazhat the triangulation was carried from Scolai Pass to within 30 miles of the boundary, a distance of 90 miles, and the reconnoissance to within 8 miles of the boundary. The topography was extended from the mouth of Canyon Creek, on the Chitina River, up the valley of the latter to and along the one hundred and forty-first meridian northward toward Mount Natazhat as far up the Anderson Glacier as practicable, including the tops of the ridges on either side, and photographs were taken from which an additional area can be plotted.

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PUBLICATIONS.

The publication of charts, coast pilots, and tide tables and of the results of the geodetic, magnetic, tidal, and other work of the Survey was continued. An inside-route pilot, describing the inside passages between New York and Key West, was prepared and published, supplying a demand for information along this route which had not before been adequately met.

A revised edition of the Regulations and Instructions for the Government of the Coast and Geodetic Survey was issued during the year.

The publication of the results of surveys of oyster beds in cooperation with the State of Maryland was nearly completed.

The annual report of the Superintendent was, by direction of the Department, published in octavo form and the results and discussions of the work, which had previously appeared as appendixes to the report, were issued as separate publications.

A number of publications were in press or in course of preparation at the close of the year.

SPECIAL DUTY.

An officer detailed for duty with the Maryland Shell Fish Commission continued on duty in charge of office work and the preparation of maps, reports, and publications. Assistance was rendered by the same officer to the Oyster Survey Commission of the State of Delaware without expense to the Federal Government.

Two officers of the Survey were detailed to represent the Department of Commerce at the Conference of Port Authorities. Both of these officers attended the meeting in New York, and one of them also attended the meetings of the conference at Boston, Philadelphia, and Baltimore.

The Superintendent and the inspector of geodetic work, as delegates on the part of the United States, attended the meeting of the International Geodetic Association.

The usual supervision was given to the work of the observatories maintained by the International Geodetic Association for determining the variation of latitude at Gaithersburg, Md., and Ukiah, Cal.

An officer of the Survey, in addition to other duties, continued to act as a member of the Mississippi River Commission.

The Superintendent is chairman of the board appointed by the Secretary of the Treasury to examine and report upon life-saving appliances.

During the winter season a number of officers were engaged in determining the positions of radio stations along the Atlantic and Pacific coasts, as requested by the Bureau of Navigation of the

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Department of Commerce. A special survey was made of the grounds of the Hygienic Laboratory of the Public Health Service in the District of Columbia.

A special hydrographic examination was begun in the Potomac River to determine the extent of the pollution of water. Hydrographic examinations were made also in the channels of Greater and Little Peconic Bays, Long Island; of Piscataqua River and Great Bay, N. H.; of the harbor of refuge at Point Judith, R. I., and of the outer and inner harbors at Delaware Breakwater.

ASSISTANCE RENDERED IN SAVING LIFE OR PROPERTY.

On October 7 the steamer *Hydrographer* rendered assistance to a four-masted schooner which had stranded near the Marconi Towers, Cape Cod. The U. S. S. *Cyrus W. Field* and the revenue cutter *Gresham* succeeded in getting the vessel afloat. The *Hydrographer* also assisted the schooner *Sallie Purnell Beswick* while aground in North Landing River, N. C.

Assistance was rendered by the steamer *Gedney* to the Pacific Coast Steamship Co.'s steamer *Curacao*, which ran aground near Fish Egg Island, Alaska. With the aid of the *Gedney* the vessel was on that occasion got afloat, but was afterwards unfortunately wrecked in Tonawek Bay. The *Gedney* at the time of this disaster took off the passengers and crew of the *Curacao* and conveyed them to Ketchikan, the nearest port of call for steamships.

During a severe typhoon in the Philippine Islands on October 15 and 16, a volunteer boat's crew from the steamer *Pathfinder* succeeded at great personal risk in rescuing the crew of a wrecked vessel. The *Pathfinder* also towed to a safe anchorage the steamer *Lizarago*, which was sighted in distress.

The officers of the steamer *Research* aided in extinguishing a fire on a new tugboat in the dock on Engineers Island in Manila Bay.

RECOMMENDATIONS.

Housing conditions.—The buildings occupied by the Bureau are antiquated and not adapted to the efficient and economical conduct of its business. The main building was erected more than forty years ago. It was rented by the Coast Survey in 1871, but was not acquired by the Government until 1891. Part of the buildings are what was formerly a stable, and the walls in some places are in such condition that they have to be shored up to keep them from falling. The land on which the buildings stand belongs to the Government. More suitable and enlarged quarters are urgently needed. Additional facilities are especially necessary for the lithographic and plate-printing establishments.

Chart construction.—On account of the character of the work of the chart-construction division, ample, well-diffused daylight is essen-

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tial in order to properly deal with the fine details of the charts. The present quarters are inadequate for the growing demands on this department of the work, not only in the respect of light but also as regards heat, ventilation, and proper supervision. The whole building plant is out of date and discreditable to the Government. An increase in the personnel and equipment is necessary to meet the urgent demand for an increased output of charts. Four additional presses for printing from aluminum plates are needed in the printing section and two additional vats in the electrotyping section.

The total issue of charts for the year was 143,694, an increase of 12,357 over the previous year. In addition 5,329 charts were issued by the suboffice at Manila, P. I. There are now 149 sales agencies for charts, coast pilots, and tide tables, not including the subagencies of the Manila office.

Vessels.—Most of the vessels of the Survey have been a long time in use and require a large expenditure for repairs to keep them in condition for service. The annual appropriations for repairs is barely sufficient to provide for the ordinary repairs, and for any extraordinary repairs it becomes necessary to ask for additional appropriations.

The demand for surveys on the Pacific coast and particularly in Alaska is most urgent. It is earnestly recommended that provision be made for the construction of three new vessels, one of which is intended to replace one of the older ones in Alaska.

The construction of three small vessels for wire-drag work and resurveys on the Atlantic coast, to take the places of launches which it is now necessary to hire for that work, would be a means of economy and would increase the annual output of work.

The extension to the Coast and Geodetic Survey of the law providing for the compensation of employees for injuries incurred in the line of duty would be a matter of justice, as these employees are often required to work in situations and to engage in occupations where the danger of accident is great.

Triangulation of the Yukon River.—The triangulation of the Yukon River in Alaska as a permanent basis for topographic, geologic, and land surveys in that region is a project which has been recommended in the estimates of annual appropriations for several years past as a most desirable object and well worthy of attention. It is hoped that provision will be made for this work during the next regular session of Congress.

The work of the Coast and Geodetic Survey suffers seriously from inadequate clerical force, but especially from having to do its work under the most costly conditions, in unsuitable old buildings, with inadequate equipment, so arranged that every operation is more expensive than it ought to be, and under the constant risk of irreparable damage from fire.

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STEAMBOAT-INSPECTION SERVICE.

STATISTICAL SUMMARY OF WORK.

During the fiscal year ended June 30, 1913, there were transported on vessels which by law are required to report the number of passengers carried 303,263,033 passengers. The total number of accidents resulting in the loss of life during this period was 66, an increase over the previous year of 27, and the number of lives lost was 436, including passengers and crew, an increase over the previous year of 172. Of the total number of lives lost, 226 were from suicide, accidental drowning, and other similar causes, which leaves 210 which can fairly be chargeable to accidents, collisions, explosions, or foundering. The total number of 436 lives lost, when compared with the number of passengers that were carried, makes a ratio of 1 life lost, including passengers and crew, for every 695,557 passengers carried.

The number of vessels inspected and certificated in the fiscal year 1913 was 7,965, with a tonnage of 9,071,992, an increase of 129 in number, with an increased tonnage of 316,712, compared with the previous fiscal year. Of the vessels certificated 6,395 were domestic steamers with a tonnage of 5,109,569, a decrease of 37 in number, with an increased tonnage of 237,037; and 450 were foreign passenger steamers with a tonnage of 3,427,314, an increase of 12 in number, with an increased tonnage of 42,409. Sail vessels and passenger barges to the number of 33 were inspected, with a tonnage of 16,298, a decrease of 5 in number and of 2,457 tons; and also 557 seagoing barges of 492,548 tons, an increase of 55 in number and of 34,303 tons over the previous year. Five hundred and thirty motor vessels with a tonnage of 26,263 were inspected and certificated, an increase of 104 in number and 5,420 tons over the previous year.

Licenses were issued during the year to 26,482 officers of all grades, a decrease of 1,554 from the preceding year. There were 7,670 applicants examined for visual defects, 84 of whom were rejected and 7,586 were passed. Compared with the previous year, these figures show an increase of 54 in the number examined and 176 in the number passed.

At the various mills 3,208 steel plates for the construction of marine boilers were inspected, a decrease from the previous year of 578, and of this number 208 were rejected. In addition to plates, there were inspected at the mills a large number of steel bars for braces and stay

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bolts for marine boilers and also several hundred plates for stock and repair purposes. Many requests were received from other branches and departments of the Government for the testing of boiler material at the mills. These received the attention of the Service, and prompt reports were rendered to the proper officials.

During the year there were examined and tested at various manufactories 233,683 life preservers, of which 3,289 were rejected.

The total number of persons in the Service at the end of the fiscal year ended June 30, 1913, was 260, consisting of 185 officers, 74 clerks, and 1 messenger. Three vacancies existed in the Service on that date.

PRECAUTIONS AGAINST OVERLOADING OF PASSENGER STEAMERS.

The Bureau has always made an earnest effort to prevent the overloading of steamers carrying passengers, and it is believed that it has succeeded in greatly reducing this practice. There are two factors to be considered in the matter of the number of passengers that steamers are permitted to carry. The first is, Have the inspectors permitted the vessel by her certificate of inspection to carry more passengers than she can safely accommodate? and second, Have the officers of the vessel permitted more passengers to be carried than is allowed by her certificate of inspection? Under section 4464, Revised Statutes, the inspectors are required to state in every certificate of inspection granted to steamers carrying passengers, other than ferryboats, the number of passengers of each class that any such steamer has accommodations for and can carry with prudence and safety. Thus local inspectors have exclusive jurisdiction in the matter of fixing the number of passengers that may be carried on board steamers. In a country such as ours, with so many varied local conditions and so many different types of vessels, this is possibly the best arrangement that can be made, but the judgment of all men is not the same, and one inspector may err in permitting a steamer to carry more passengers than its capacity justifies, whereas another may err in not permitting a steamer to carry as many passengers as might be safely and prudently allowed. If it were practicable to have a uniform and general rule by which passenger allowance could be estimated, it would be most desirable, but under the varying conditions it is practically impossible to put such a rule into effect. The Bureau, however, has repeatedly warned local inspectors that the responsibility is theirs and that they would be held responsible in the event of disaster, and it is believed that these warnings and instructions have had a good effect. There is one factor, however, by which the allowance of passengers has been substantially controlled, and that is the rules at present in force in regard to lifeboat equipment, for where steamers are boated according to the number

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of passengers carried they are restricted in their passenger allowance by the extent of their equipment, and consequently can not carry a larger number of passengers than is justified by their lifeboat capacity.

The matter of preventing steamers from carrying more passengers than are allowed by their certificates of inspection received particular attention during the past season, and a system of having inspectors actually count passengers and submit reports on small cards has been instituted and soon will be in general use by inspectors of the Steamboat-Inspection Service and by customs inspectors. This will enable the Department to be in immediate and close touch with the counting of passengers on steamers and do much to prevent overloading. It is believed that the counting of passengers should be entirely under the control of inspectors of the Steamboat-Inspection Service, which, of course, would require additional inspectors, because the small number at present available is not sufficient for that purpose.

HULL INSPECTION.

An examination of the General Rules and Regulations Prescribed by the Board of Supervising Inspectors will show that the board has given studious and intelligent attention to the matter of boiler construction and inspection. The General Rules and Regulations in this regard are respected and frequently referred to by various authorities in this and other countries. It is the purpose of the Supervising Inspector General, however, to increase the efficiency of the hull inspection. A long step in this direction was taken at the last meeting of the Board of Supervising Inspectors, in January, 1913, when a rule was adopted providing that in the inspection of hulls, boilers, and machinery of vessels the rules promulgated by the American Bureau of Shipping governing material and construction of hulls, boilers, and engines, except where otherwise specially provided for by the Rules and Regulations, will be accepted by inspectors as efficient standards of excellence. This was the first official recognition of the work of the American Bureau of Shipping. It should be a matter of pride to all Americans interested in the development of the American merchant marine to establish a standard of American ship construction that will be distinctly American, and it is hoped that the day will soon come when American shipbuilders will be governed by American standards and American specifications.

There is already in the General Rules and Regulations a requirement that the owner of every new vessel of over 100 gross tons, when making application for first inspection of the vessel, shall furnish

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the local inspectors of the district where the vessel is to be inspected drawings or blue prints, in plan and section, showing fully the general construction of the vessel, of wood, iron, or steel, including dimensions, spacing of frames, disposition of hull plates, outside and in, or of outside and inside planks, construction of decks, construction of transverse and longitudinal bulkheads and location of same, space between decks, and details of principal scarfs, and the owners are also required to furnish details of the shapes, dimensions, and unit weights of all structural parts of the hull and the kinds of material of which made, including kinds of wood. A full description of the riveting of all parts of an iron or steel hull must be furnished. These data in the hands of the local inspectors enable them more intelligently to examine the hulls of vessels, and in after years, as a vessel goes from one district to another, to keep in touch with it with a view to determining exactly the extent of deterioration.

The effect of the increase in the number of details and items for hull inspection has been most beneficial, and comparison of the Rules and Regulations now in force with those of 10 years ago will show that the Service has made steady progress in the direction of efficient and intelligent hull inspection.

REINSPECTIONS.

While it is necessary that local inspectors make very rigid examination of vessels at the annual inspection, it is apparent that no matter how rigorous the annual inspection may be steamers would not be kept in good condition were it not for the reinspections required by this Service. Every excursion and ferry steamer is reinspected at least three times during the year for which the certificate of inspection is issued, or during the season of navigation, and while these reinspections require an increased expenditure for operating the Service the added expense is more than justified by the results obtained.

TRAVELING INSPECTORS.

The supervising inspectors of steam vessels do considerable traveling in their districts, with a view to obtaining uniform administration of law therein, but the Office of the Supervising Inspector General should have two traveling inspectors, who, working under the direction of that Office, could do excellent work in making reinspections, and the Supervising Inspector General would thereby be in closer and more intelligent touch with both the local inspectors and the supervising inspectors. This is the custom in other departments and in private services, and is fully justified by results.

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MOTOR VESSELS.

The extension of the steamboat-inspection laws to the 250,000 motor boats which are said to exist in the United States is probably unnecessary, and is certainly impracticable without a large increase of the inspection force and of appropriations. Nevertheless, the existing conditions respecting motor boats should not be allowed to continue. The Supervising Inspector General has frequently referred to the desirability of extending the inspection of motor boats.

The Department inspects the hull and machinery of all steam vessels over 65 feet long and limits the number of passengers to be carried thereon, except that it has no authority to control the number of passengers carried on steam ferryboats.

As the law stands, only such steam vessels under 65 feet long as are tugs and towboats are inspected. Steam vessels less than 65 feet long carrying passengers are not inspected, nor are the number of passengers on such vessels directly limited—both for lack of legal authority. If steam vessels between 40 and 65 feet long carry passengers, the Department approves the design only of their boilers and machinery. It can only control the number of passengers to be carried on such vessels under the present law by the indirect means of regulating the life-saving equipment.

The Department, however, has no direct power over a motor vessel either as regards passengers or machinery. It can inspect the hull, tanks, and piping, but only when the vessel is of 15 tons measurement or more, and when it carries passengers or freight for hire. If, for example, the motor vessel is a private vessel of over 15 tons measurement, the Department can not inspect her in any way. Even if she is a towing motor vessel of this size, there exists no lawful power to inspect her.

The Department can not limit the number of passengers carried for hire on a motor vessel, however big, except by fixing the life-saving equipment. Over motor vessels smaller than 15 tons the powers of the Department are limited to seeing them provided with the necessary life-saving equipment, lights, life preservers, and means of extinguishing gasoline fires. Here the present powers of the Government stop.

I wish to make this perfectly plain. If a Government inspector stands upon a dock watching a motor boat sail away with three times as many passengers as she ought to have and her machinery defective and her hull leaking, he would have no power in the premises, were she a motor boat under 15 tons measurement, except to see that there was a life preserver in good order provided for every passenger on board, that she had the proper lights and the proper

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means of extinguishing gasoline fires, with a whistle and a bell of standard dimensions. He could, indeed, require such a vessel to have a licensed operator, but for that license no examination is required. The powers of the Department in this matter should be extended. Every man whose pleasures or pursuits take him upon the water may see that motor boats are frequently loaded with passengers or pleasure seekers beyond the margin of safety. Every motor vessel used for carrying passengers should be inspected by the local inspectors of steamboats and given a certificate of inspection. The examination need not be of such detail as that of a steamer, but it should be sufficiently thorough to assure the passengers and the public that such boats are in good condition. It should, however, further be provided that motor vessels may not transport passengers in excess of a fixed number, perhaps 20 or 25, unless such boats have been subjected to the full inspection prescribed for steam vessels, and unless those in charge of them have been licensed after examination in the same manner as corresponding officers on steam vessels. At present a person may obtain a license as operator of motor vessels without being a citizen of the United States or without being 21 years of age, and while being unable to read or write. Under the law, licenses to operators of motor boats are issued without any examination whatever. The inspectors of the Inspection Service are without authority to ask whether the person applying for such motor-boat license is color blind or whether he understands or can read the pilot rules. Yet such persons, having a license so obtained, may, and in fact do, take charge of motor vessels carrying passengers for hire. Operators of motor boats should be required to show that they are not color blind and have good vision, that they can read the pilot rules and laws, and that they have a reasonable knowledge of them. The existing conditions are a menace to the lives of innocent and unsuspecting passengers and should not be permitted to continue.

The measures proposed could be carried into effect in a reasonable time and at a moderate expenditure of the public funds and would involve no hardship or undue restraint upon an important industry. The inspection would put the owner of the boat to no expense. The reckless navigation of an uninspected motor vessel jeopardizes the lives of passengers on inspected vessels, as well as those on the motor boat itself.

The numbering of motor boats for identification as automobiles are numbered is very desirable.

TRANSPORTATION OF DANGEROUS ARTICLES.

By section 4472, Revised Statutes, the Steamboat-Inspection Service is given a certain control and jurisdiction over the transportation

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of dangerous articles, but this control is confined to steamers carrying passengers. It does not extend to freight vessels. Dangerous conditions may arise in the transportation of articles that are not covered by section 4472, and the section should be amended so as to give the Steamboat-Inspection Service control over the entire situation, with authority to make regulations covering the water transportation of dangerous articles in somewhat the same manner as the Interstate Commerce Commission makes regulations covering the rail transportation of such articles. While there is not the same danger incident to the transportation of dangerous articles on freight steamers as on steamers carrying passengers, because there is not so large a number of persons on board freight steamers, yet if an explosion should occur on a freight steamer while passenger steamers were navigating near by the loss of life would be very great.

The Steamboat-Inspection Service is very particular about enforcing the provisions of the statutes in regard to the transportation of gasoline on steamers carrying passengers. Under the provisions of section 4472, Revised Statutes, the transportation of gasoline by steam vessels when such gasoline is carried by motor vehicles is not prohibited, but it is provided that all fire in such vehicles shall be extinguished immediately after the vehicles enter the vessels, and that the fire shall not be relighted until immediately before the vehicles leave the vessels. The statutes further provide that any owner, master, agent, or other person having charge of passenger steam vessels shall have the right to refuse to transport motor vehicles the tanks of which contain gasoline, naphtha, or other dangerous fluids, and so much do the steamboat companies fear the dangers of gasoline that many of them refuse to carry automobiles that have gasoline in their tanks. Chauffeurs, however, endeavor at times to evade the vigilance of the officers of steam vessels and violate the statutes, thereby jeopardizing the lives of many persons traveling on steamers.

The officers in charge of steam vessels, as well as the inspectors of the Steamboat-Inspection Service, make earnest efforts to see that the rule in regard to the transportation of gasoline on steamers carrying passengers is not violated, in which efforts every citizen should cooperate to the end that the lives of passengers on such steamers may be safeguarded.

DIVISION OF FIRST SUPERVISING INSPECTION DISTRICT.

The first supervising inspection district embraces all waters and rivers of the United States west of the Rocky Mountains, and the Hawaiian Islands. The supervising inspector stationed at San Francisco, Cal., has charge of the local inspection districts of San Fran-

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cisco, Cal.; Los Angeles, Cal.; Portland, Oreg.; Seattle, Wash.; St. Michael, Alaska; Juneau, Alaska, and Honolulu, Hawaii. The territory covered by this district is extensive, and no one man, no matter how efficient he may be, can supervise it properly. It is believed, therefore, that the work of the first supervising district should be divided, and the supervising inspector stationed at San Francisco should be required to supervise only the local districts of San Francisco, Los Angeles, and Honolulu. A new supervising inspector should be stationed at Seattle to supervise the local districts of Seattle, Portland, St. Michael, and Juneau. This would permit more efficient supervision of the work in this territory. The Department in the estimates for the fiscal year 1915 asked for an additional supervising inspector, and if Congress makes an appropriation for the salary of this officer he will be assigned to duty as above described. In order to provide for such additional supervising inspector it will be necessary that section 4404, Revised Statutes, be amended to that effect.

At the last session of Congress authority was granted for the establishment of a board of local inspectors at Los Angeles, Cal., and appropriation was made, in the urgent deficiency bill approved October 22, 1913, for the salaries of a local inspector of hulls, a local inspector of boilers, and a clerk at that port.

CERTIFICATES OF INSPECTION.

The Department believes that it is not necessary to furnish steamers the large number of copies of certificates of inspection required by the present practice. The same purpose would be served if local inspectors furnished the original certificate direct to the vessel, supplying the collector or chief officer of customs with a copy thereof. The result would be a saving in the number of copies of certificates of inspection required, and the original copy could be furnished the master or owner of the vessel, which should always have been the practice. It is recommended that the law be amended in this respect.

CHANGE OF NAME OF SERVICE.

In his annual report for the fiscal year ended June 30, 1912, in speaking of the activities of the Steamboat-Inspection Service, the Supervising Inspector General points out how varied its work is. It now does more than inspect steam vessels, and therefore the name "Steamboat-Inspection Service" does not correctly describe the activities of the Service. It is recommended that the name of the Service be changed to Marine-Inspection Service.

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SUPERVISING INSPECTOR GENERAL'S OFFICE.

The Supervising Inspector General, as required by law, gives his attention to the most important matter of obtaining uniform administration of the steamboat-inspection laws and the General Rules and Regulations passed by the Board of Supervising Inspectors. The central office does this in part by rulings, which are sent monthly to the Service and to the various interests of the merchant marine. It also publishes excerpts of letters to its inspectors in regard to matters that relate to the procedure of the Service, and in this way during the past year a greater uniformity has been obtained in the administration than ever before.

Uniformity of procedure is also obtained through the excellent card-index systems which have been installed in the Office of the Supervising Inspector General as well as in the offices of the local and supervising inspectors. For instance, to such an extent is there uniformity that it is possible for a clerk in the office of the local inspectors at New Orleans, La., to be transferred to the office of the local inspectors at New York, N. Y., and be familiar with the routine duties of that office. The matter of uniformity in clerical work, however, is really the least important. It is more important to obtain uniform inspection, and the Bureau obtains that result through its card system. To illustrate: Whenever a certificate of inspection of a vessel is issued, the local inspectors are required to file in their office a card entitled "Record of annual inspection" and forward a copy of that card to the Bureau at Washington. This card record of annual inspection contains data as to the name of the vessel, class and gross tonnage, the date inspection was completed, the local district in which inspected, the local district where previously inspected, the place where inspected, when hull was built, the date when same was rebuilt, the date when boilers were built, the date when boilers were rebuilt, the kind of service and the character of route, the number of passengers allowed, the number of officers and crew required, the name and address of owner, and detailed information in regard to the lifeboat equipment. With such a system the Bureau is in close and immediate touch with the local inspectors in the most outlying districts of the Service, and can by a careful examination of such cards ascertain whether inspectors are proceeding in the same manner at all places. When certificates of inspection are indorsed or amended, local inspectors are also required to furnish the central office with card reports setting forth the nature of such indorsement or amendment.

Whenever an officer's license is issued by the local inspectors, they are required to file in their office a card-form record of the license issued, copy of which is sent to the Bureau at Washington. This

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enables the Bureau to have an alphabetical index of all persons receiving licenses from this Service. These cards contain information as to the name and address of any person licensed, whether naturalized or native, the class and grade of license, the location of the board of local inspectors issuing same, the date of issue and number of former license, the date and number of issue of the new license, and the waters for which license is issued; and as indorsements are made from time to time upon such a license local inspectors are required to file in their office a record of such indorsements and forward to the Bureau at Washington a copy of the card record of indorsement. Thus, as in the case of certificates of inspection, the Bureau at Washington is in intimate touch with all of the local inspectors and can ascertain if they are proceeding uniformly in all districts and are obeying the rules and regulations in regard to the issuing of licenses.

The Bureau requires local inspectors to submit reports of all casualties and violations of the steamboat-inspection laws, and it has a follow-up system by which it requires the inspectors to submit upon card forms the results of such investigations as they may conduct. The Bureau is able to ascertain through these casualty reports whether there is uniform administration in the matter of reporting violations and in taking necessary action incident thereto.

Local inspectors are required to file in their offices daily card records of work done, and to forward to the Bureau at Washington at the end of each day copies of these cards. By this method the Bureau is in close touch with the daily events in all the local districts.

The foregoing description of the card-index system of the Bureau shows the value of this system in obtaining uniform results. There is, however, not a sufficient number of clerks in the office at Washington to check these cards as rigorously as should be done. The Department has therefore asked for an additional clerk at $900 per annum, and if this clerk is allowed by Congress it will be possible to check up closely the vessel-inspection, license, casualty, and daily cards that are now received, and thereby to correct errors which it can not at present take note of, because the clerks who file the cards have as much as they can do, in connection with their other duties, to see that certain important features are correct and to place the cards alphabetically in the cabinets.

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BUREAU OF NAVIGATION.

TONNAGE OF THE MERCHANT MARINE.

The total documented merchant shipping of the United States on June 30, 1913, comprised 27,070 vessels of 7,886,518 gross tons. This is the largest tonnage in our history, and, excepting the British Empire, exceeds that of any other two nations combined. Of the total tonnage 1,027,776 gross tons were registered, showing the largest American tonnage for foreign trade in 27 years. Even more auspicious is the fact that over half of the year's increase was in tonnage for the foreign trade. Shipbuilding, too, prospered during the fiscal year, the output of our yards reaching 346,155 gross tons, an increase of 50 per cent over the previous 12 months. Under the Panama Canal act of August 24, 1912, the privilege of American registry is free to foreign-built ships not over 5 years old. The apprehension so long felt or simulated that free registry for the foreign trade would injure domestic industry has been dispelled, as after 10 months' experience under free registry we are better off than before the law was enacted and face a future of abundant promise. The difference in the cost of building vessels for the foreign trade in the United States and abroad has been largely eliminated, and in consequence we are a long step nearer a normal share in the world's ocean-carrying trade.

NAVIGATION RECEIPTS.

The receipts from tonnage duties last year were $1,273,789.43, an increase of $117,778.68 over the receipts for the previous year and the largest receipts from this source since 1884, when an annual duty of 30 cents per ton was levied. Tonnage duties are imposed without discrimination and are virtually on a minimum revenue basis, the rates in this country being substantially equivalent to corresponding charges imposed on vessels in British ports and materially less than the corresponding charges levied by the other principal nations of Europe. These rates were not changed by the tariff act of October 3, 1913.

Collections during the year of annual excise from foreign-built yachts owned by Americans, under section 37 of the tariff act of 1909, amounted to only $492.84. The law was repealed by the tariff act of

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October 3, 1913. The entire collections from the time it took effect, September 1, 1909, to June 30, 1913, amounted to $68,619.21. The constitutionality of the law, it will be recalled, was disputed at the outset and the Supreme Court of the United States has not yet rendered a decision in the test cases. Excise amounting to upward of $350,000 is involved in these cases, and in view of the repeal of the act the cases have been advanced on the calendar and the questions at issue will soon be determined.

SHIPPING COMMISSIONERS.

Shipping commissioners at 15 seaports shipped, reshipped, and discharged 379,188 seamen on American vessels during the past year, an increase of 4,405 over the previous year. The cost of the service was $62,374.13, a reduction of $999.40 compared with the previous year. The commissioner's office at Honolulu was abolished on July 7, 1912. When the Panama Canal is open it will undoubtedly be desirable to reestablish an office at this port, and if American shipping shall make such general use of the canal as is anticipated it will be necessary in another year to increase the clerical force of the shipping commissioners' offices at several seaports. Furthermore, the shipping commissioners are charged generally with the enforcement of the navigation laws in so far as they relate to seamen on merchant vessels, and the enactment into law of any of the several measures relating to seamen which have been considered by Congress in late years should be followed by appropriations to enable the Department to give effect to such legislation.

SAFETY AT SEA.

I have deemed it best in this report to make few specific recommendations on the subject of navigation, because so many large projects for the improvement by law of conditions on the sea are still indeterminate and under discussion here and abroad. The conclusions upon which we may agree with other nations are beginning to assume definite shape and soon may be expressed in the form of conventions and statutes.

The subject of safety of life at sea has been ever present for two years in the minds of Congress and of the Federal administration. The results of long and careful study of its problems, both at home and abroad, should be assembled at the coming session of Congress in legislation which will stand the test—the actual saving of life in time of peril. The time expended in study will not have been wasted if the legislation enacted shall embody the best thought and the highest attainable standards of the maritime powers.

On November 12, 1913, representatives of the 14 principal maritime nations met at London to consider the subject and to draft an inter-

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national convention, which doubtless will be laid before Congress early in the coming year. It is promising for the success of that conference, indicative of the spirit which prompted its meeting, and will, I trust, guide its deliberations, that a month before it met steamships of the United States, England, Germany, France, and Russia, hurriedly called to rescue a burning ship in a storm, cooperated to avert calamity. The willingness to work together and to subordinate individual action in the interest of a common humanity, shown by the captains of the 10 steamships which rescued passengers and crew of the steamship *Volturno*, is not without its lesson to the Governments represented at London.

The Department has been hampered by lack of resources in making as thorough preparations for the conference as have been made by Great Britain, Germany, France, and possibly other nations. Last January the Senate Committee on Commerce and the House Committee on the Merchant Marine and Fisheries, charged with the consideration of matters affecting merchant shipping, were impressed with the importance of such preparations, and in joint session recommended an appropriation of $10,000 to be immediately available for the purpose. To my regret the efforts of my predecessor and of myself to secure this appropriation failed. Accordingly, in May, with the cooperation of the heads of other Departments, I organized six committees, made up of officers of these Departments, to consider respectively the following subjects: Hulls and bulkheads; efficiency of officers and crews; aids and perils to navigation; lifeboats, davits, life rafts, and life preservers; fire protection, and radiotelegraphy. I take this occasion to thank the members of these committees for the time and study which they have devoted to the problems set before them.

On October 4 the President appointed 12 commissioners to represent the United States at the conference, selected in part from the membership of the committees mentioned, and I am confident that through this commission the views of the United States will be adequately and earnestly conveyed to the conference.

The conference is considering an extensive program. If it is able to embody its conclusions in an international convention, and if the Senate of the United States will advise and consent to its ratification, the largest amount of affirmative legislation on navigation matters which Congress has considered in many years must be framed and enacted. Among the many topics to be included will be the subdivision of the hulls of ocean-going passenger steamers into water-tight compartments and more exact regulations as to bulkheads. This will involve an extension of the powers of the Department, and if those powers are to be exercised and the will of Congress properly executed adequate appropriations must be made for the

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purpose. So far as lifeboats and other life-saving appliances are concerned, the large grant of powers already bestowed upon the Department will probably prove ample, but I believe that Congress should vote the Department enough money to conduct inspections when needed other than at annual fixed periods. Adequate protection against fire has repeatedly been urged.

By the foresight of Congress the United States already has statutes in successful operation requiring apparatus and operators for radio communication on passenger and cargo steamers on the ocean and the Great Lakes, and there is reasonable probability that our legislation on this subject will be adopted in principle by nations generally. The value of wireless apparatus is undisputed and there can be no question of the need of maintaining a rigid and constant inspection of the apparatus and operators on American and foreign ships leaving our ports.

RADIO COMMUNICATION.

During the past fiscal year the duties of the Bureau of Navigation in respect to radio communication were greatly extended. By the act of July 23, 1912, ships required to carry wireless apparatus and operators under the act of 1910 were required also to carry an auxiliary power supply for emergency use in event of the failure of the ship's main power supply. In the three notable marine catastrophes of this autumn, the loss of the steamships *State of California*, *Templemore*, and *Volturno*, it was necessary to resort to the auxiliary batteries, as the main engines of the ships became disabled. The inspection of the auxiliary apparatus has increased the work of the inspectors. The same act prescribed a constant watch with two operators on shipboard, where previously one only had been required. The act further prescribed means of constant communication between the watch officer on the bridge and the operator in the radio room. In addition, after April 1, 1913, the act became applicable to vessels on the Great Lakes, and since the beginning of the current fiscal year these several requirements have applied to cargo steamers with crews of 50 or over. The enforced use of wireless was so extended, indeed, that for a time the manufacturers of apparatus and the training schools for operators found difficulty in supplying demands created by the legislation.

The act of August 13, 1912, to regulate radio communication and to give effect to the Berlin Radiotelegraphic Convention, went into operation on December 13. Since that time the inspection force has been engaged in the examination and licensing of land stations in addition to its duties in respect to ships. Under the operation of these several laws the field radio service during the fiscal year 1913

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made 3,201 inspections of ships and 715 inspections of land stations, and examined and licensed 1,427 radio operators. The service, which in 1911 was virtually confined to the seaports of New York, Baltimore, New Orleans, and San Francisco, has been extended, as far as 11 men can accomplish that result, to all the principal seaports and ports on the Great Lakes and to some of the principal interior centers of radio communication, and by two inspection trips the system of Federal supervision has been partially established in Hawaii and Porto Rico.

The expenses of the radio-inspection service for the past fiscal year were $144.45 less than the appropriation of $37,880. In the estimates for the coming year, I have asked for $48,750—an amount barely sufficient to meet the necessities of the service and inadequate if by legislation its duties are to be increased over those now imposed on it. Wireless telegraphy has so conclusively demonstrated its value at sea, and its use ashore is extending so rapidly, that it requires no foresight to affirm that Congress will be called on hereafter to extend the inspection service.

LOAD-LINE CONFERENCE.

The tendency of modern commercial and industrial life to eliminate waste and reduce superfluous expenditure of effort is responsible in a large measure for the increasing demands for cooperation among nations. The results obtained by standardization in American industrial development are familiar. The aim of international conferences frequently is to establish standards in commerce which will insure fair terms of competition for all, economy of time and effort, and at the same time efficiency and safety. The depth, for example, to which an ocean cargo boat may be loaded with safety does not depend on the flag of the nation it flies. It is determined by natural laws. Unless there be agreement among nations that these laws shall be uniformly recognized, nations which observe them rigidly in the interest of safety may be on unequal terms of commercial competition with other nations less scrupulous about safety of life. The observance of different standards in different countries, furthermore, involves expenditure of time to no useful end. The appropriation of $5,000 by Congress for American representation at the International Conference on Load Lines for Merchant Ships at London next spring will result in a direct commercial gain to our sea-borne commerce and an even more desirable improvement in the security of labor and capital employed in ocean transportation. The conclusions of the conference probably will not be available for the consideration of Congress at the next session, but any delay in action will be more than offset by the advantages from uniform action by maritime nations.

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SHIPPING COMBINATIONS.

The Committee on the Merchant Marine and Fisheries, under resolution of the House of Representatives during the Sixty-second Congress, made a searching investigation into shipping combinations in the foreign as well as the coasting trade. The report and conclusions of the committee will speak with that authority which usually accompanies painstaking and impartial effort to establish definitely essential facts. The legislation which that committee doubtless will recommend will probably require considerable time and effort on the part of Congress. In recommending legislation on navigation matters in the name of the Department of Commerce I have kept in mind that part of the time which Congress can devote to these subjects already has been preempted for the consideration of legislation which will embody the matured conclusions of one of its own important committees.

ENFORCEMENT OF THE NAVIGATION LAWS.

The efforts of the Department to secure a thorough compliance on the water with the laws relating to the navigation and inspection of vessels were maintained throughout the year, except during the months of July and August before funds became available under the appropriation act. The fines, penalties, forfeitures, and costs involved in 3,506 cases of violations of various statutes considered by the Department amounted to $31,987.85. The amount during the current fiscal year will be considerably larger. In meritorious cases the Department has considered all mitigating circumstances, and in cases of reasonable doubt the benefit has been given to the offender. At the same time the Department is aware that a critical public and press look to it to exact compliance with those conditions of security which Congress has aimed to promote by law. I believe that a sum equivalent to the penalties collected for violations of these laws should be set apart annually for the use of the Department in extending further its efforts to carry out these laws. For this reason the estimates for the current year carry an item of $35,000, instead of $15,000, which has been appropriated annually since 1910. Even this amount, I am confident, will be exceeded by the receipts from fines, penalties, and forfeitures under the policy pursued by the Department, and the service will therefore be self-sustaining.

With part of this proposed appropriation the Department will buy and operate a second vessel similar to the motor boat *Tarragon*, which has been most useful in enforcing the laws. The *Tarragon* was in commission 225 days during the fiscal year, visited 19 customs districts, inspected several thousand vessels, and reported 902 infractions

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of the laws. The penalties incurred aggregated $279,190, which the Department mitigated to $5,504. The cost of operating the boat was $7,743.20. It was thus nearly self-sustaining. During August and half of September, 1913, its officers reported 605 violations of law in New York Harbor and vicinity. The boat has been fitted with the best wireless apparatus devised by the Bureau of Standards and it has been instructed to visit between January and July, 1914, every port from Key West, Fla., to Eastport, Me.

The policy of the Department in fining offenders against the navigation laws is to mitigate the penalties to a nominal sum in cases of first offenses where the offenses have been unintentional. Experience shows that most boat owners are willing to comply with the law when its provisions are made clearly known to them in a courteous spirit. It is rarely necessary to exact a severe penalty, and only in cases where the violation of law has been deliberate or serious. Investigation shows a much fuller compliance with the requirements of law than has hitherto been the case and a much greater activity on the part of the local officers whose duty it is to enforce the navigation laws.

ADMEASUREMENT OF VESSELS.

It is important that our laws governing the measurement of vessels be revised at the coming session of Congress. This subject is somewhat complex, both on account of the technical details involved and of questions of general policy. At present the laws of the United States on this subject resemble closely the laws of Great Britain, Germany, and other maritime nations except as to the measurement of shelter decks and certain spaces for passengers constructed above the first deck not a deck to the hull. The rules for the measurement of vessels passing through the Panama Canal differ materially from the British and German rules and resemble closely the rules employed by the authorities of the Suez Canal. The new Panama rules increase appreciably the net tonnage of vessels, upon which most maritime charges are levied, above the net tonnage ascertained under the British and German rules. This increase is due primarily to the adoption of the so-called "Danube rule" for measuring propelling power spaces and to more rigid rules concerning shelter decks. It is well, therefore, to decide whether the general rules for the ports of the United States shall be brought into accord with new Panama rules or whether our American rules in the respects mentioned shall be more closely assimilated to the practice of Great Britain, Germany, and maritime nations generally. The former course will involve an increase in charges on shipping, American and foreign, in all phases of navigation throughout the

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United States. The latter course will in some instances diminish those charges. The question does not materially affect the Federal revenue from tonnage taxes, which amounts to over $1,200,000 annually. Any likely change in the rules would not increase or decrease this revenue by 10 per cent. The Federal charges on shipping are very light, however, by comparison with the charges which shipping is required to pay in foreign ports and with the various charges based on tonnage for State and local purposes and for private services rendered. The matter is now being carefully considered by the Department, and at a later day a bill embodying its views will be submitted to Congress.

ANCHORAGES.

The enactment of a law authorizing the Secretary of Commerce to define anchorage grounds for vessels in improved harbors and bays and to enforce the observance of regulations is recommended. The power requested is to be exercised only when maritime and commercial interests demonstrate that such regulation is required for safe navigation. The Secretary of Commerce now has this power for the harbors of New York and Chicago, and every year requests are made for the exercise of similar powers at other seaports, usually after an explosion or fire on shipboard has drawn attention to the lack of legislation on the subject.

In particular the attention of the Department has been drawn to the necessity of defining anchorage limits in Hampton Roads. Many hundreds of vessels arrive and leave these waters each month. Some lie in the Roads for days and even weeks. These ships have no designated anchorage grounds, and incoming and outgoing vessels must zigzag through this anchored fleet in daylight and darkness in all kinds of weather. Among these vessels are many important passenger steamers, carrying a monthly average of over 60,000 passengers. There is no semblance of a regulation as to where vessels shall anchor along the route covered by this commerce, for the harbor master's limits from Norfolk and Newport News do not extend to these waters. During the last 10 years many accidents have occurred in this locality from the above conditions.

The regulation of anchorages is general throughout the maritime world, and in the United States seems to be peculiarly a function of the Federal Government and especially of the Department of Commerce, which is charged with the execution of the laws relating to commerce and navigation. A bill such as is recommended passed the Senate in the last Congress, and I trust time will suffice for its favorable consideration by both branches of the present Congress.

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DECK LOADS.

The transportation of deck loads of timber on the Atlantic, especially during the winter months, is attended with danger, and in the regulation of such transportation we have been backward. The loss of one of these cargo boats does not attract the notice which is aroused by the risks incurred by ocean passengers, but it is not to our credit that Great Britain and Canada should have shown more consideration for the lives of seamen engaged on such ships than we have done. Again, derelicts, which fill so large a place in the public eye, are almost always lumber-laden vessels, and our failure to regulate such deck loads contributes to the creation and maintenance of these menaces to navigation. The Department during the year has been in consultation with those on both sides of the Atlantic concerned in this subject, and a measure of relief will be prepared for the consideration of Congress at the coming session.

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CONCLUSION.

Since any summary of the current work of the Department which included only a statement of its condition and procedure to the close of the fiscal year ended June 30, 1913, would be not only incomplete but inaccurate in giving a view of the actual existing conditions, I have ventured to enlarge this report sufficiently to indicate the plans for future work. These plans had their rise during the fiscal year covered by this report and may be esteemed a normal outgrowth of the work and the conditions to which the report technically refers. The separate reports of the several bureaus of the Department will give its work in detail and to them I must refer for a more complete discussion of the service the Department is endeavoring to render the public.

Respectfully

WILLIAM C. REDFIELD,
Secretary.

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REPORTS

OF THE

DEPARTMENT OF COMMERCE

BUREAU OF FOREIGN AND DOMESTIC COMMERCE
BUREAU OF CORPORATIONS
BUREAU OF STANDARDS
BUREAU OF THE CENSUS
BUREAU OF FISHERIES
BUREAU OF LIGHTHOUSES
COAST AND GEODETIC SURVEY
STEAMBOAT-INSPECTION SERVICE
BUREAU OF NAVIGATION
APPOINTMENT DIVISION
DIVISION OF PUBLICATIONS

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REPORT

OF THE

CHIEF OF BUREAU OF FOREIGN AND DOMESTIC COMMERCE

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REPORT

OF THE

CHIEF OF BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

DEPARTMENT OF COMMERCE,
BUREAU OF FOREIGN AND DOMESTIC COMMERCE,
Washington, August 5, 1913.

SIR: The following report of the work of the Bureau of Foreign and Domestic Commerce for the fiscal year ended June 30, 1913, is respectfully submitted:

The Bureau has been conducted under its present name since August 23, 1912, on which date Congress, in the act making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ended June 30, 1913, authorized the consolidation of the former Bureaus of Manufactures and Statistics. The service performed by both these bureaus has been continued with but little material change, aside from the discontinuance of the records of internal commerce formerly printed monthly by the Bureau of Statistics, no appropriation having been made for that service. Reductions were also made in the total appropriations for clerical service that had been available for the two former bureaus, and this rendered it necessary to transfer certain employees to other branches of the Department. Unfortunately, the Bureau was compelled also to reduce a number of employees by one grade in order to bring expenditures within the limit of the available funds. It is earnestly urged that the Bureau be provided at the earliest date possible with additional positions of the higher grades. This would permit the office to restore to their former salaries efficient employees who were reduced through no fault of their own and no failure to fill satisfactorily positions at a higher rate of pay.

Although the progress of the Bureau was somewhat checked by the loss of clerks, there has been a year of active service in all the branches of the office for the promotion of commerce. It is believed that the publications of the Bureau are daily becoming more practical in character and that the wider distribution of trade information to those who can use it effectively is developing satisfactorily. The classified records and indexes of manufacturers and exporters maintained in the Bureau are now constantly used to disseminate special reports of all kinds. Thousands of names were added to these indexes during the year, the names being classified according to articles produced or exported. The Bureau develops this record

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currently, and is endeavoring in many ways to obtain accurate and practical information in regard to the needs of its clients—the business men of the United States.

PUBLICATIONS.

DAILY CONSULAR AND TRADE REPORTS.

The entire edition of the Daily Consular and Trade Reports was distributed during the whole year and there are now on file—as was also the case a year ago—a great many unfilled applications from those fully entitled to receive this publication. The necessary authority for an increased circulation should be given the Bureau. The correspondence resulting from the "Trade Opportunity" items printed in it reached a total of tens of thousands of letters, and the new business resulting therefrom, it is certain, amounted to a large sum. The Bureau received many letters, in fact, attesting this. Furthermore, through suggestions made by this office, consular officers are now reporting an increased number and a greater range of trade opportunities, including construction work of all kinds, thus widely extending the scope of their reports. The commercial agents of the Bureau are also contributing many such items.

PUBLICATIONS ISSUED DURING THE FISCAL YEAR.

There follows a list of the publications of the Bureau for the fiscal year ended June 30, 1913, and a partial list of Confidential Circulars, over 100,000 of which were distributed:

Special Consular Reports:
- 53. Foreign Markets for Motor Vehicles. 143 pp.
- 54. Foreign Trade in Canned Goods. 192 pp.
- 55. Foreign Trade in Musical Instruments. 102 pp.
- 56. Foreign Trade in Paints and Varnishes. 72 pp.
- 57. New Zealand: Its Resources, Industries, and Trade, with Suggestions as to its Development as a Market for American Merchandise. 220 pp.
- 58. Machine Tools in Latin America. 32 pp.
- 59. Development of Motor-Vehicle Trade Abroad. 70 pp.

Special Agents Series:
- 54. Cotton Goods in Turkey: Part II, Saloniki and Smyrna. 36 pp.
- 54. Cotton Goods in Turkey: Part III, Syria and Bagdad. 48 pp.
- 56. English Methods of Dyeing, Finishing, and Marketing Cotton Goods. 35 pp.
- 57. Shoe and Leather Trade in France and Switzerland. 44 pp.
- 58. Packing and Marketing of Cotton. 39 pp.
- 59. Mining in the Federated Malay States. 25 pp.
- 60. Commercial Organizations. 48 pp.
- 61. Cuba as a Buyer and Seller. 32 pp.
- 62. Foreign Credits. 421 pp.
- 63. Shoe and Leather Trade in Scandinavia. 38 pp.
- 64. Cotton Goods in Egypt. 24 pp.
- 65. Chemical Industries of Belgium, Netherlands, Norway, and Sweden. 85 pp.
- 66. Electrical Instruments and Meters in Europe. 88 pp.
- 67. Commerce and Industries of Alaska, Hawaii, Porto Rico, and the Philippine Islands. 116 pp.
- 68. Shoe and Leather Trade in Russia. 23 pp.
- 69. Cotton Goods in Canada. 50 pp.
- 70. Shoe and Leather Trade in Italy and Austria-Hungary. 60 pp.
- 71. Cotton Goods in the Red Sea Markets. 64 pp.

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Tariff Series:
25a. Supplement to Tariff of France. 14 pp.
28. Customs Tariff of Japan. 88 pp.
Foreign Tariff Notes Nos. 7, 8, and 9.
Miscellaneous Series:
6b. Promotion of Commerce. 29 pp.
8. Commercial and Agricultural Organizations of the United States. 125 pp.
9. The Sugar Industry. 135 pp.
11. American Manufactures in Foreign Markets. 177 pp.
Confidential Bulletin:
19. Market for American Boots and Shoes in South Africa. 8 pp.
Confidential Circulars (partial list):
1. Armored Cruisers for Norway.
2. Market for Electrical Machinery and Apparatus in Constantinople.
3. Machinery and Tools for Australia.
5. Railway Equipment for the Java State Railway.
6. Electrical Railway for Szechwan, China.
8. Searchlights and Dynamos for Coast Defenses, Chile.
9. New Public Enterprises in Constantinople.
11. Proposed Construction of Electrical Railways in Budapest.
15. Irrigation Works in Australia.
20. American Coal for Europe.
22. Canned-Goods Trade in Servia.
25. Petroleum Pipe Lines.
26. Coasting Steamer.
30. Steamboat for Morocco.
33. Locomotives for Java and Sumatra Railways.
41. Refrigerating Machinery for Russia.
46. Street-Cleaning Supplies and Equipment.
49. Footwear for the Servian Army.
51. Sugar Factories for Java.
57. Market for Fresh Apples in France.
58. Harbor Works in Russia.
61. Public Improvements in Haiti.
63. Sale of American Motors for French Fishing Boats.
70. Cold-Storage Facilities at Havre.
72. Water Pipes for South African City.
73. Machine Tools for State Railways of the Dutch East Indies.
74. Railway Equipment for China.
75. Railway Supplies for Turkey.
77. Market for Flour in Syria.
78. Cement-Making Machinery in Japan.
79. Activity of British Manufacturers in Paper-Making Machinery in Japan.
81. Builders' Supplies for China.
83. Gun-Making Equipment for China.
84. Proposed Construction of Further Reservoirs for Glasgow.
88. Australian Market for Tubes.
89. Italian Market for American Manufactured Steel Products.
90. Electrical Motor Cars and Turbo-Alternator Sets for Shanghai.
91. Market for American Quarrying Equipment in Newfoundland.
92. Market for American Fencing and Tools.
93. Liverpool Market for Hardware Specialties.
94. Engines and Motors for Syria.
96. Electric Crane for Switzerland.
97. Structural Steel for Brazilian Bridges.
100. Electric Cranes for Greece.
Statistical publications:
Foreign Commerce and Navigation of the United States, 1912. 1,342 pp.
Statistical Abstract of the United States, 1912. 836 pp.
Statistical Record of Progress of the United States, 1800–1912, and Monetary, Commercial, and Financial Statistics of Principal Countries [annually]. 94 pp.
Monthly Summary of Commerce and Finance of the United States. 104–173 pp. each.

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Statistical publications—Continued.

Advance Sheets from Monthly Summary of Commerce and Finance. 32–33 pp. each.

Calendar Year Statements of Imports and Domestic Exports of Merchandise, etc. 49 pp.

Total Values of Imports and Exports of the United States [monthly]. 2 pp. each.

Exports of Domestic Breadstuffs, Cottonseed Oil, Food Animals, Meat and Dairy Products, Cotton, and Mineral Oils [monthly]. 12 pp. each.

Imported Merchandise Entered for Consumption in the United States and Duties Collected Thereon [quarterly]. 85–177 pp. each.

Sailing Dates of Steamships from Principal Ports of the United States to Ports in Foreign Countries [monthly]. 15–20 pp. each.

SALE OF REPORTS.

As the editions of the publications of the Bureau are limited by law and by the available printing fund, it has been found advisable in a number of instances to provide for the sale of bulletins on practical commercial subjects by the Superintendent of Documents, of the Government Printing Office. This action has made possible a much extended distribution of the publications of the Bureau. For example, there have been sold 1,939 copies of the report on Foreign Credits, and 1,046 copies of the Directory of Commercial Organizations. This practice of selling these documents not only emphasizes their practical value but permits the Bureau to use its printing allotment to much greater advantage.

The advisability of placing on sale the Daily Consular and Trade Reports is also suggested. That journal is of such undoubted value to business men, manufacturers, and exporters that it would seem good policy to permit the indefinite extension of its circulation by providing for its sale by subscription.

In further development of this practice the free distribution of the monthly issue of Sailing Dates of Steamships was discontinued in April, and that bulletin is now sold by the Superintendent of Documents for 10 cents a copy, or $1 a year.

FIELD WORK.

The work of promoting commerce by field investigations has covered a wide range of subjects and territory at home and abroad. Conditions in the cotton-textile trade have been studied in Canada and in a number of European countries, and these researches have been extended to Africa, where one of the commercial agents of the Bureau has visited Egypt, Sudan, and other Provinces. This is the first careful study ever made by agents of the Bureau of opportunities for the retension and extension of our sales of cotton fabrics on that continent, and much valuable information has been obtained.

From Australia, the Straits Settlements, and the Orient two representatives of the Bureau have reported on the markets for machinery and tools and for canned goods. In South American countries another agent has been investigating the field for the sale of drugs and proprietary medicines, and also, as far as was practicable, has reported on conditions in the canned-goods trade. At present, in western Europe, careful studies are being made by trained men, in one instance of the manufacture of oilseed products of all kinds and

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in another of the facts in the important subject of by-products of coke ovens, in which it is believed that further advances have been made abroad than in the United States.

The shoe and leather trade in Europe has received much attention, and a very comprehensive survey of this industry in most of the European countries was completed during the year.

One of the most practical bulletins issued during the year was the report on Foreign Credits, a book of 421 pages, in which were combined the results of an investigation in Europe by a commercial agent of the Bureau and a series of consular reports on the same subject.

Commercial promotion as performed by chambers of commerce and similar organizations in England, France, Belgium, Switzerland, and Germany was the subject of another investigation, and a digest of facts in commercial legal procedure in those countries was obtained at the same time. The reports on these matters, soon to be issued, should be of great interest to American commercial organizations and to exporters.

An officer of the Department of State, detailed to make special investigations for the Bureau, is now engaged on a general commercial survey of India, and similar general commercial reviews of Cuba and Porto Rico, Hawaii, Alaska, and the Philippines were published during the year. Special reports were also received from a representative at Cuzco, Peru.

In view of the approaching completion of the Panama Canal, opening the west coast of South America to ships from New York, a report on freight rates from a number of interior points in the United States to the ports in that portion of South America was prepared. This will aid our exporters in quoting c. i. f. prices to correspondents in Latin America. Further, that portion of the World Trade Directory covering the countries of South America is being revised. This publication should also be opportune at this time, when interest in these countries is so much stimulated by the completion of the canal.

The list of publications of the Bureau for the fiscal year, printed elsewhere in this report, indicates the volume and range of the valuable reports which were contributed by commercial agents during this period.

The Bureau has continued its very useful studies of the activities of commercial organizations in the United States, and as a result the helpful relations which exist between such associations and the Department have been materially strengthened. Many of the representatives of the Bureau on returning from foreign countries have made addresses on commercial subjects before trade bodies.

It is the purpose of the Bureau to station one of its field agents in New York at an early date as a permanent representative, to make such investigations as may be required in that commercial center and to place manufacturers and exporters in more direct touch with our work. The effective distribution of useful trade information can be promoted materially by such representation, not only in New York but, as means are provided, in other important commercial cities.

In September occurred the death of Maj. John M. Carson, formerly Chief of the Bureau of Manufactures, who had devoted the

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last eight years of his life earnestly to the promotion of our commercial interests. His last service was the preparation of a bulletin on Packing and Marketing of Cotton, an interesting exposition of the uneconomic methods used in the United States in handling this great staple.

POTTERY INDUSTRY.

In pursuance of its function of gathering information, and with the view of placing useful facts at the disposal of the President and Congress, the Bureau began, in May, a study of conditions in the pottery industry, in all its phases. This investigation was initiated in the pottery manufacturing center in East Liverpool, Ohio, but will be extended, as it is further developed, to other localities and probably to European countries as well.

It is desired to present as a result of this investigation, which is to be made by as highly trained men as can be obtained for all branches of the work, a complete picture of the industry, with all its features disclosed, as far as it is possible to accomplish it, in their true relation and significance. Such a study should have very important and far-reaching promotive effects on our manufacturing industries, and service of this kind as a current activity of the Bureau would place at the disposal of Congress information on which may be based legislative action. The industries themselves should also profit by this work, done in an impartial spirit, as a broad view of any branch of commerce or manufacture is difficult to obtain.

CIRCULATION OF PLANS, SPECIFICATIONS, SAMPLES, ETC.

Attention is again invited to the possibilities for service in the collection and distribution of samples and the purchase (in numbers) of plans, specifications, and similar material for prompt circulation among manufacturers and others interested. Such a service should be maintained actively, instead of casually, as the office is forced by pressure of other duties to conduct it. The work would demand the attention of one or two employees for much of their time, and there are not enough clerks for other more pressing current work and none to spare for new duties like this. The Bureau's fund for use in the field could be devoted in part to the purchase of material if the office were in position to handle the increased work at home.

PERMANENT CORPS OF COMMERCIAL AGENTS AND ATTACHÉS.

The Bureau desires to repeat the suggestion made a year ago that definite statutory recognition be given to its field service, assuring continuity of employment and policy. Gradually its corps of agents should be increased both at home and abroad until the Bureau is in a position to compete with all other nations in the task of observing and reporting promptly on commercial matters of every character. Permanent commercial attachés stationed at posts especially important to our export trade should be maintained by the Department to serve the interests of manufacturers and exporters and to undertake trade investigations to which it is not practicable, in view of other exacting duties, for consular officers to give adequate attention.

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DIRECTORY OF COMMERCIAL ORGANIZATIONS.

For several years the Bureau has been recording in its files the names of commercial organizations in the United States, with such facts in regard to their functions and activities as were available. This record was found very useful when it became necessary to comply with Resolution No. 406 of the Senate of the United States, passed December 12, 1912, in which the Department of Commerce was requested to compile a list of commercial and agricultural organizations. This list was duly prepared, and by the use of convenient symbols there were added to the names many facts in regard to the associations listed, such as the rate of dues, income, membership, committees, and similar matters. The Bureau reprinted this list as one of its own bulletins. As stated elsewhere, there have been many copies sold by the Superintendent of Documents and it is evident that the directory supplies information that is useful in business circles. The Bureau should be equipped to maintain its record of commercial organizations currently, and an annual directory of these associations would serve a very useful purpose.

DIVISION OF STATISTICS.

The recording and analyzing of the statistics of imports into and exports from the United States, and of the trade with its noncontiguous territories, formerly performed by the Bureau of Statistics, was carried forward during the fiscal year 1913 in practically the same form as heretofore, the work being performed by the employees who were transferred to the Bureau of Foreign and Domestic Commerce from the former Bureau of Statistics.

Schedules of imports and exports, utilized in the publication of the Monthly Summary of Commerce and Finance, were enlarged at the beginning of the fiscal year, adding about 20 per cent to the number of articles enumerated in the Monthly Summary. The statement showing countries from which the principal articles were imported and to which the principal articles were exported was made a separate section of the Monthly Summary and the number of articles named was somewhat increased. The quarterly and annual statements of imports for consumption were compiled and published in the same form as in the preceding year. The monthly statement of shipments to the noncontiguous territories and the shipments from the noncontiguous territories to the United States was somewhat reduced in the number of items named, but not materially changed in other particulars.

The advance publication of the section of the Monthly Summary, which shows imports and exports by articles under the title "Advance Sheets from the Monthly Summary of Commerce and Finance," was continued during the year, but did not include the statement of countries from which the principal articles were imported and to which the principal articles were exported, as included in the full Monthly Summary. The insertion of these articles-by-countries statements in the Advance Sheets has, however, been requested by many persons receiving that publication.

The work of collecting, recording, and compiling the statistics of internal commerce was necessarily abandoned by reason of the omission from the appropriations for the fiscal year 1913 of the funds

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which had for many years been allowed for that purpose. The inability of the Bureau to present statistics of movements of internal commerce on the lakes, rivers, and railways, and of the cencentration of the chief articles of domestic production at the great interior centers, has been met with expressions of serious regret on the part of many correspondents. Persons supplying this information have been requested to continue it, and in a few instances compilations were made and furnished by letter to publishers and others specially desiring such information, though this could only be done in an extremely limited way by reason of the lack of working force available for the purpose. The records of movements on the Great Lakes, as filed by vessel masters at the customhouses, have been forwarded by the collectors of customs to the Bureau and filed for reference, in order that they may be available in case future appropriations should enable the resumption of the publication of the record of this important feature of domestic commerce.

Current demands upon the force employed in the statistical work has prevented the issuance of a second edition of the Statistical Abstract of Foreign Countries, though the preparation of material for this work was continued during such time as was possible without interference with the necessary current work of compiling monthly and annual statements and answering inquiries from Congress, business organizations, and those engaged in foreign and domestic commerce.

A special study prepared by the Statistical Division entitled "American Manufactures in Foreign Markets," showing the exportation of manufactures during a term of years and their distribution by grand divisions and countries, was published and distributed by the Department. No other special publications were undertaken in the division, owing to the fact that the entire time of the working force was necessarily occupied upon current work.

The preparation of semiweekly discussions of the commerce of the United States and of the commercial world was continued during the year and advance copies distributed to the press in all parts of the country for simultaneous publication upon a fixed release date.

DIVISION OF FOREIGN TARIFFS.

The unusual demands for information made upon the Division of Foreign Tariffs in consequence of the proposed revision of the United States tariff have strained to the utmost the resources of the division since December, 1912. Two elaborate statements were compiled at the request of the Chairman of the Committee on Ways and Means of the House of Representatives. The first of these statements, showing comparative ad valorem duties in the United States and foreign countries, was published as Part III of the Appendix to House Report No. 5, Sixty-third Congress, first session. The second statement was published by the committee in pamphlet form under the title "Foreign Tariff Systems and Industrial Conditions." These two statements occupied practically the entire time of the division, aside from that given to current correspondence, from December, 1912, to April, 1913. Other comprehensive statements dealing with foreign tariffs and customs procedure were prepared for the use of the Department of State, the Treasury Department, and the Department of Justice, as well as members of both Houses of Congress.

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TARIFF STATEMENTS.

As exporters have become more familiar with the ability of the Bureau to give precise information concerning the rates of duty and customs regulations prescribed by foreign countries, the number of inquiries has increased. The preparation of the necessary statements in answer to such inquiries involves a large amount of labor.

This line of service is perhaps the most practical rendered by the Division of Foreign Tariffs, and can not be discontinued or even greatly reduced without serious loss to American exporters. If the service is to be performed by a governmental agency, it should manifestly be open to all who could utilize it with profit, and steps have been taken to bring it to the attention of all exporters in the United States. To this end a description of this phase of the work was inserted in the Daily Consular and Trade Reports and a circular, embodying the same information, was widely distributed. To insure the best results, inquiries should be made direct by those interested and should be limited to those articles and countries concerning which there is immediate need of information. Inquiries from commercial organizations for the benefit of their members and from information bureaus for the use of their clients are discouraged, but, except when the privilege is manifestly being abused, have not actually been refused. By adopting the practice of limiting the service to actual manufacturers and exporters, the work of preparing statements might be lessened to some extent, and, still more important, the danger of the use of the statements after changes in the rates would be reduced.

To facilitate the preparation of statements and to minimize the labor involved, special forms are being drafted, with explanations concerning the nature of the statements and the qualifications to which they are subject, together with a list of the additional charges in various countries, definitions of dutiable weight and value, and conversion equivalents for the principal foreign units of currency, weight, and measure.

It is believed that the use of information furnished by the Bureau to American exporters would be further facilitated by the publication of a kind of tariff primer, giving concise definitions of terms used in foreign tariffs and describing, in greater detail than is possible in the explanatory notes referred to in the preceding paragraph, the more complicated methods used in assessing duties in certain foreign countries. Work will be begun on such a publication as soon as the publications already undertaken can be completed.

Arrangements have been made to place Australian duty stamps on sale in New York, thus removing a serious inconvenience to exporters in the United States desirous of sending advertising matter to Australia. In that Commonwealth catalogues and other advertising matter are subject to duty even when mailed in single copies, and the most convenient method of prepaying the duty is to affix duty stamps, thus insuring delivery without delay or annoyance to the addressee. Heretofore these stamps, while on sale in the United Kingdom and Canada, were not available to manufacturers in the United States.

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TARIFF PUBLICATIONS.

The unusual demands upon the division for tariff information, unaccompanied by an increase in its personnel, necessitated the practical suspension of its publication work, save for a supplement to the Customs Tariff of France and notices of current tariff changes published in the Daily Consular and Trade Reports and reprinted in Foreign Tariff Notes, of which Nos. 7, 8, and 9 were issued. A special statement of the duties on paints and varnishes in Latin America was incorporated in Foreign Tariff Notes No. 8.

PATENTS AND TRADE-MARKS.

Frequent inquiries in regard to patent and trade-mark laws in foreign countries are received by the Bureau and are usually referred to the Division of Foreign Tariffs for reply. Owing, however, to the lack of an expert familiar with the subject and the incompleteness of the information on file, such inquiries can not as a rule be handled satisfactorily. Ignorance on the part of American exporters of the need of registering trade-marks and taking out patents has involved many houses in lawsuits and pecuniary loss. The details of the requirements materially differ with each country, and frequent changes necessitate continuous systematic study similar to that carried on in relation to foreign tariffs. In view of the fact that the official gazettes of practically all foreign countries are received by the Division of Foreign Tariffs and carefully read for tariff legislation, and of the close relations existing with the American consular service, the Bureau of Foreign and Domestic Commerce would seem to be particularly well equipped to inaugurate a service in connection with patent and trade-mark legislation, similar to that now rendered in connection with foreign tariffs. A recommendation for an appropriation of $3,000 to enable the Bureau to enter upon this work was made last year and has been repeated in the estimates submitted for the next fiscal year.

In preparation for the extension of the work, instructions were issued to diplomatic and consular officers requesting copies of foreign laws dealing with internal-revenue taxes, patents and trade-marks, and pure-food and sanitary measures. The valuable collection of documents received in response affords a nucleus for the study of foreign economic legislation along these lines.

DIVISION OF CONSULAR REPORTS.

The editorial work of the Division of Consular Reports of this Bureau increased greatly in volume in the fiscal year 1913. Its scope is very wide and it requires close study and research into the commercial and fiscal statistics of every country in the world, into economic facts and industrial changes that are taking place, and a determination of what is worth presenting to the business men of the United States. The available manuscript contributions from consular officers and commercial agents increased in number during the past year to 20,000, owing to more active field work, making more difficult the task of condensation and consolidation of such reports. While it entails extra editorial work the resulting greater practical value of

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the publications of the Bureau is plainly evident. The Consular Division collates for publication the reports of over 300 American consular and diplomatic officers and of 10 or more special commercial traveling agents of the Department of Commerce.

The number of monographs edited in the past fiscal year was 8 more, and the number of printed pages 1,866 greater, than in the previous fiscal year, the classification being as follows:

	1912		1913	
	Number.	Pages.	Number.	Pages.
Daily Consular and Trade Reports	306	5,888	306	6,528
Index to Consular and Trade Reports	4	127	4	137
Special Consular Series	5	360	7	712
Commercial Agents Series	8	527	15	1,232
Confidential Bulletins	3	26	2	18
Miscellaneous Series	2	85	2	252
Total	328	7,013	336	8,879

In the preparation of such a large number of reports with the present inadequate editorial force there is constant danger of error. It is desirable that every statement of fact and conclusion be checked, and proofs should be read very carefully. Several additional editors should be provided so that closer revision may be made of "copy." This help is also needed because of the heavier volume of work. There is now considerable unavoidable delay in issuing the series of reports by commercial agents and consular officers, and such delay impairs their value. These field investigations are greatly benefiting the export trade of the country, not only in manufactured articles but in farm products, and information obtained at so much cost and effort ought to be conveyed promptly to those in position to utilize it.

The American consular service is now used to promote trade as never before. It affords the opportunity to make special and exhaustive studies of markets for specific lines of American goods, and of the other factors entering into our business relations with foreign peoples. For such special investigations the Consular Division makes a careful study of the prospective field and of what American producers want to know, and then frames comprehensive instructions to guide the consuls in seeking information. When all the data have been received a composite review or analysis of the entire subject is prepared. Many more investigations of this character could be made if the division were better equipped.

As elsewhere stated, the special "Foreign Trade Opportunity" feature of the Consular Division's activities is undoubtedly selling many million dollars' worth of American products abroad each year. The number of these edited in eight years has been as follows: 1906, 198; 1907, 960; 1908, 1,227; 1909, 1,180; 1910, 1,592; 1911, 1,796; 1912, 2,145, and 1913, 2,162.

As many of these inquiries from foreign merchants and importers call for several lines of merchandise, the number of new direct sales, and new connections formed for extending American commerce through this medium is a factor in the rapidly increasing export trade. From knowledge of the practical results of the "Trade Op-

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portunity" service it is estimated that the majority of these effect sales. It is safe to conclude that such sales during the past year aggregated many million dollars. In addition to the 2,162 "Foreign Trade Opportunity" notices published last year, 97 confidential circulars were prepared giving more detailed information in regard to trade openings.

Another service performed by the Consular Division is the preparation for publication in Daily Consular and Trade Reports of the proposals for United States Government supplies and public works. This is much appreciated by contractors and manufacturers. It has also resulted in many more competitive bids for the contracts, enabling the Government to get the advantage of lower prices and a wider selection of commodities desired. The number of these proposals published has been as follows: Fiscal year 1911, 252; 1912, 468; and 1913, 600.

A separate publication compiled monthly by the Consular Division is "Sailing Dates of Steamships from Principal Ports of the United States to Ports in Foreign Countries." This was improved, in both form and contents, during the fiscal year 1913.

LIBRARY.

A branch of the Bureau which needs more active development is the library. There is a vast accumulation of useful trade information in the office which should be made readily available by indexes and by intelligent study of the library. Efforts are being made in this matter, but the resources of the Bureau are not adequate to maintain this work at the desired level of usefulness.

CORRESPONDENCE—EXPANDING DUTIES OF THE BUREAU.

The general correspondence of the year was much increased as compared with the previous year, reaching an estimated total of nearly 90,000 incoming and 80,000 outgoing letters. With the extension of information in regard to the facilities of the Bureau among the commercial interests there has come an ever growing demand upon the office for its trade reports and for its various special bulletins, and the limited clerical force has more and more difficulty in coping with the volume of work of this character. The Bureau has such elements of growth that, unless the corps of employees is augmented as the demands on the office increase, the very success of its efforts tends to affect the quality of its service. It is difficult to state with appropriate moderation the possibilities for valuable promotive service which lie in the future for the Bureau of Foreign and Domestic Commerce. This useful service can not be developed, however, unless adequate provision is made to maintain its various activities at a proper standard.

Our foreign commerce is growing very rapidly, and the Bureau may reasonably claim to be a factor of importance in this growth. Its service of publicity in regard to foreign trade conditions is relied upon by many thousands of manufacturers and exporters. Our exports for 1913 were $2,465,884,149 and our imports were $1,813,008,234. Viewed in relation to this total, the cost of the maintenance of this work is very small.

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The Bureau should become the recognized and authoritative Federal clearing house for useful trade information from all governmental sources, and on every variety of commercial subjects. This can be accomplished only by the evolution and extension of its present activities toward greater efficiency and by the prompt adoption of new methods of promotive service as opportunity is presented for such service. There are many attractive fields of activity for the Bureau now plainly in view and these would be developed actively should the required resources be provided.

Respectfully,

A. H. BALDWIN,
Chief of Bureau.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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REPORT

OF THE

COMMISSIONER OF CORPORATIONS

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REPORT

OF THE

COMMISSIONER OF CORPORATIONS.

DEPARTMENT OF COMMERCE,
BUREAU OF CORPORATIONS,
Washington, February 9, 1914.

SIR: The report of the Commissioner of Corporations for the fiscal year ended June 30, 1913, is hereby respectfully submitted.

The last annual report of the Commissioner of Corporations was issued February 22, 1913, and in certain respects covers, in addition to the fiscal year ended June 30, 1912, the period between July 1, 1912, and February 14, 1913. Ordinarily the annual report covers only the preceding fiscal year. As the Bureau of Corporations completed the first 10 years of its existence on February 14, 1913, it seemed fitting that the said report should in some respects cover this additional period.

During the fiscal year ended June 30, 1913, which is covered by this report, a number of changes occurred in the officers of the Bureau of Corporations. Commissioner Herbert Knox Smith resigned July 18, 1912, and Mr. Luther Conant, jr., the Deputy Commissioner, was appointed by the President as Commissioner on August 7, 1912. Mr. Francis Walker, a special examiner in the Bureau, was appointed Deputy Commissioner on August 22, 1912. Mr. Conant resigned as Commissioner on April 15, 1913, and the present Commissioner was appointed by the President on May 27, 1913. The statements of the work done by the Bureau for the fiscal year refer, therefore, almost entirely to such as was performed by the direction of my predecessors.

The reports published during the said fiscal year are the following:

Taxation of Corporations, Part IV, Western Central States, covering the system of taxing manufacturing, mercantile, transportation, and transmission corporations in the States of Minnesota, North Dakota, South Dakota, Iowa, Nebraska, Kansas, and Missouri. (November 29, 1912.)

Transportation by Water in the United States, Part IV, Control of Water Carriers by Railroads and by Shipping Consolidations. (December 23, 1912.)

Lumber Industry, Part I, Standing Timber. (January 20, 1913.)

Report on the International Harvester Co. (March 3, 1913.)

Report on the Steel Industry, Part III, Cost of Production, full report. (May 6, 1913.)

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Investigations which were begun by the Bureau prior to my appointment and which are still being carried on include the lumber, tobacco, fertilizer, and agricultural implement industries, and also the State systems of taxation of corporations.

In the latter part of the fiscal year covered by this report three investigations were undertaken pursuant to resolutions of the United States Senate. The purposes of these investigations can best be stated by the following excerpts from the said resolutions:

To investigate the causes of the advance in price of ammoniates and nitrates used in the manufacture of commercial fertilizers, and report the findings to the Senate at the earliest practicable time. (Adopted March 1, 1913.)

To inquire fully as to the names of the party or parties or corporations that sold the cotton alleged to have been bought in the year 1910 by a pool of purchasers, who are now under indictment by the Department of Justice, and at what prices these parties sold this cotton to the alleged pool, and whether or not the parties selling this cotton owned the cotton at the time of the sale thereof, and the price of spot cotton in the markets of this country on the date of the making of these contracts or the sale of these contracts for this cotton, and to report the same at the earliest possible moment to the Senate. (Adopted May 27, 1913.)

To make a thorough investigation into the price of oil in Oklahoma, transported by interstate pipe lines, and report to the Senate whether or not the price is artificially fixed below the general market level in the United States, quality and transportation considered; and if so, by whom such prices are fixed and the method by which it is done. (Adopted June 18, 1913.)

The Bureau immediately proceeded to carry out the investigations set forth in the above resolutions, and is still engaged in that work.

During the fiscal year the Bureau gave extensive aid to other bureaus and departments of the Government in the matter of details of its employees for special and technical work for which these employees had special training and experience.

The total appropriations for the fiscal year ended June 30, 1913, were $254,200, of which $212,065.18 was expended.

The number of persons employed June 30, 1913, was 124.

There were no changes in the law governing the Bureau of Corporations.

NEW WORK UNDERTAKEN.

Since the close of the fiscal year additional investigations have been commenced by the Bureau of Corporations.

Resale price maintenance.—The question of a fixed price for the resale of commodities; that is, the fixing by a manufacturer or jobber, with regard to the commodities which he deals in, of the prices at which retailers must sell such articles, is a problem which is attracting much public attention at the present time. Some of the legal questions connected with this practice have been determined by the courts, but the question of the economic advantages or disadvantages of this practice have never been investigated by the Government. The Bureau has initiated a comprehensive inquiry with regard to this subject.

Conflict of State foreign corporation laws.—Each State of the Union has its distinctive laws regarding the admission to the State of corporations organized in other States or countries, and their subsequent operations. This has resulted in a wide divergence in the legal prerequisites for and conditions pertaining to the doing of business in the various States with respect to corporations whose

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business is of an interstate character, which has often seriously hampered and restricted the conduct of business. These affect, for example, the rights of lien and other contract rights of such corporations. The penalties imposed for technical failure to comply with such prerequisites and other legal conditions are, in many instances, drastic and severe. The actual money lost by corporations due to unwitting violations of the laws of different States, is undoubtedly very large.

The Bureau is engaged in a study of the laws of the various States on this subject, with a view to making recommendations as to the best means employed by the States in the regulation of foreign corporations, and with a view to cooperating with State legislative committees, if desired, in the modification of such laws, to the end of obtaining greater uniformity therein. It is believed that if, as a result of this investigation, the Department is able to advise corporations doing an interstate business that at least in a number of States the system of regulation of foreign corporations has been established upon a more or less uniform basis, an important constructive piece of work will have been done which will benefit not only the business world but the respective communities as well.

Trust legislation and proposed reforms and remedies.—With a view to providing useful material in connection with proposed legislation regarding trusts and corporations, and methods of competition, the Bureau has been making a study of existing legislation and proposed reforms and remedies. In particular, an analysis has been made of Federal and State legislation regarding trusts, with the principal judicial decisions thereunder; of the various kinds of trade agreements found in practice which have relation to such laws; of the laws of foreign countries regarding the same subject; of the opinions of representative men in different walks of life regarding reforms and remedies; and of the provisions of the various bills introduced in the present Congress with respect to this subject.

Efficiency of trusts.—One of the alleged advantages claimed by monopoly, by which it is argued that monopoly is justified as an ultimate fact in industrial evolution, is the alleged greater cheapness of its production. The question is whether the trust form of organization is really efficient. If it be found that smaller competitive units in industry can produce commodities more cheaply, or even as cheaply as monopolistic units, and that they have other and greater advantages than those claimed for the monopolistic or trust system, then the problem is finally settled in favor of the competitive system, and the chief argument for the regulation of monopoly is destroyed. This is a scientific question of fact, and it is the plan of the Bureau to investigate this question.

While from a governmental point of view there are various aspects of the trust question which are of great importance, such as the relation of trusts to popular government and their effect on the social and economic conditions of labor, there are two aspects of it which are peculiarly within the domain of the Bureau, namely, the effect upon the cost of production and distribution and the effect upon the price to the consumer.

It is contended by some that with the increase in the size of industrial enterprises there goes a reduction in the cost of extraction, manufacture, and distribution, and that such reduction in cost is

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accompanied by lower prices to the consumer and does not involve a reduction in wages or an impairment of the conditions of labor. Even if these claims were true, the question would still remain, of course, whether the evil resulting from large combinations would not be greater than the alleged advantages of cheaper production and distribution. It is contended, on the other hand, that the source and origin of monopoly is found chiefly in the desire to exploit the general public by stock-jobbing schemes for the immediate profit of the promoters, or for the purpose of obtaining control of the market and exacting unduly high prices from the consumer. Many large combinations have failed and demonstrated their economic inefficiency. Combinations which have obtained control of the market, it is admitted, have prospered, but this is alleged to be due to their monopolistic position, and not to superior efficiency. According to those who hold this view, there is a point beyond which the increase in size of operations does not result in an increase in economy and efficiency, but rather in loss and waste, so that the maximum efficiency is not attained by large combinations, but instead by concerns of moderate size. If this latter contention be true, then, as has been said, the monopolistic system contains in itself the seeds of its own decay.

Again, some of those who dispute the superior efficiency of large combinations contend that this claim is made merely as a blind for the purpose of selling watered stock. They say that such organizations are established for the purpose either of getting control of the market and exacting excessive prices from consumers, or of issuing large amounts of watered stock for the purpose of selling such stock to the public. In the first case, it is argued such combinations are not concerned with the promotion of greater efficiency but merely with obtaining a monopoly; in the second case they are chiefly concerned with selling the stock, and as they can not claim to the general public that it has a great value due to monopoly, they are obliged to find another selling argument, namely, superior efficiency.

The problem, perhaps, can not be solved dogmatically, but a comprehensive and a painstaking investigation would doubtless afford a great volume of facts, an analysis and study of which could not fail to throw much light upon the question.

Of almost equal importance with the determination of this question of comparative efficiency is that of the price policy of such large industrial combinations as have achieved a substantial control of the market. Those who allege that such industrial enterprises result in greater economy and efficiency in production often overlook the equally important question whether or not they absorb all the benefits of such economies in increased profits without conceding any share thereof to labor in higher wages, or to consumers in relatively lower prices or improved quality of goods, etc. The determination of the facts in respect to this question also might not be such as to establish broad generalizations or conclusions, but the importance of having the facts is none the less obvious.

PROPOSED WORK OF THE BUREAU.

The work of the Bureau of Corporations in the past has been chiefly confined to the study of conditions relating to combination and monopoly in particular industries, largely with a view to procure

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for the Executive Department of the Government reliable information regarding the conditions existing therein, and so to enable it to take more intelligent action in matters of immediate urgency. In the 11 years since the Bureau was established, the knowledge of the Government as to the general character of the problems presented through these particular investigations and otherwise has been greatly increased and has been made much more definite. The study of the question has now advanced to a point where it is important to have a more comprehensive basis of information, and to make a comparative study of the facts with reference to fundamental underlying principles.

Whether the Bureau of Corporations is continued as at present organized, or whether as a result of proposed legislation a commission of similar jurisdiction shall be substituted therefor, there is one matter which ought to be handled by some Federal governmental agency.

Both the necessities of the Government in the regulation of interstate commerce, and the reasonable requirements of individuals regarding information as to the affairs of particular corporations, make it desirable that some governmental agency should be provided with the power and duty to obtain and keep as a public record certain facts with reference to associations and corporations which are engaged in interstate commerce, due regard being had to the protection of trade secrets and those matters which have no public interest. This is especially necessary with regard to the larger companies, but while size limitations have been sometimes suggested, as, for example, a gross business of $5,000,000, it is important to obtain certain facts from smaller concerns in order to determine, among other things, the proportion of control which the larger corporations possess in any particular branch of industry. Such information might include copies of charters and by-laws, names of directors and officers, kinds and amounts of capital stock, bonds and other similar obligations, statements of assets and liabilities, and of profit and loss, or income, dividends, both cash and stock, the names of other corporations in which it holds stock, and the names of other corporations which hold its stock, together with the respective amounts in each case, other companies in which its officers or directors are either officers or directors, and their stockholdings in such other companies, agreements made with other corporations engaged in a similar or related business with respect to control of markets or territory, price fixing, etc. Such returns should be made annually by such corporations in a manner prescribed by the Government, and, in connection with the first annual return, additional information regarding the original organization, capitalization, and physical valuation of the property of the corporation might be required, together with the amounts of stock or other consideration paid to promoters or underwriters.

While there are well-known facts and conditions which require immediate legislative consideration, as, for example, as to interlocking directorates, holding companies, and definitions as to what shall constitute unfair competition and restraint of trade or monopoly, yet a careful analysis and coordination of such information would throw much light upon industrial conditions, and would be of

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great value to the President, to Congress, and to the public in the determination of further governmental policy.

To undertake the collection and compilation of reports of corporations engaged in interstate commerce generally, together with the work on special investigations now as hitherto being conducted, would require, of course, a very great enlargement of the personnel, offices, and equipment of the Bureau, and this would necessitate an increased appropriation.

In connection with the question of appropriations, permit me to call your attention to the manner in which certain investigations are referred by resolutions of Congress to the Bureau of Corporations. By this avenue there have come to the Bureau from time to time investigations which in themselves would consume nearly the entire appropriation of the Bureau. Such investigations are of immediate importance, but, for the greater part, are of interest to particular localities or branches of business rather than to the country at large. The Bureau is desirous of performing this useful and important function, and is well equipped to do so, but to pursue investigations of this character would frequently absorb all resources at its command, with the result that a constructive policy along a definite line would be seriously hampered. It is, therefore, strongly urged that when investigations of this kind are directed to be made by the Bureau of Corporations, additional appropriations should be made in each case.

Very respectfully,

JOSEPH E. DAVIES,
Commissioner of Corporations.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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REPORT

OF THE

DIRECTOR OF THE BUREAU OF STANDARDS

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REPORT

OF THE

DIRECTOR OF THE BUREAU OF STANDARDS.

DEPARTMENT OF COMMERCE,
BUREAU OF STANDARDS,
Washington, July 1, 1913.

SIR: There is submitted herewith a report of the work of the Bureau of Standards for the fiscal year ended June 30, 1913.

The report of the activities of the Bureau during the year necessarily gives but the briefest summary of its work. In no year of its history has there been as full cooperation of all divisions of the Bureau in testing and research. This cooperation has minimized the somewhat narrowing effects of a rigid division system. Each problem when studied in a broad scientific spirit leads into every specialty, so that the fullest cooperation of the entire Bureau is essential to its success. The gratifying results of such cooperation are particularly notable in the development of standards for gas, in the researches upon metals, and the methods of testing the properties of materials, in the study of electrolysis experimentally and in the field, in the structural materials investigation, and in many other cases where success depends upon many specialties.

In no case is such cooperation more striking than in the gradual development of the public-service commission work of the Bureau. This is an outgrowth of the weights and measures activity of the Bureau, of the cooperation with the Interstate Commerce Commission, and with other regulative and inspection services, notably the wireless service, the regulation of navigation, municipal gas regulation, standardization of specifications for materials, and central-station power service. The regulation of public utilities is distinctly a measured regulation of their technical details and is efficient only as it is based upon measures and standards. Public-utility regulation simply applies measurements and standards to new fields. Such regulation is effected by the specification of measurable standards for each element so selected as to assure efficient service; these factors may be, for example, the measure of value, quantity, size, composition, quality, speed, and the like. Safety even involves measures where, for example, safety depends upon the strength of the properties of materials or upon safe speed limits.

Such work is an extension of the general purpose of the Bureau as a whole, cooperation in all movements which have for their object increase in efficiency in all fields through measurements and standards. The three hundred or more publications of the Bureau will give a fuller account of the researches and methods by which its work is accomplished.

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ELECTRICITY.

The completion of the new electrical building now makes it possible to develop several important new lines of work. As the testing has increased it has been necessary to reduce the time spent in scientific research. In the study and testing of electrical measuring instruments greater accuracy in commercial practice is called for than formerly. As large electric power plants are being established and electric energy sold in greater quantity, and as improvements are made in instruments and methods employed in commercial practice, the necessity for the standardizing laboratory to carry on continual research work is emphasized. An important magnetic research has been under way, viz, the study of the relation between the magnetic and mechanical properties of iron and steel. An important subject to be studied by the Bureau is illuminating engineering and the problems connected with it. The photometric laboratory has been engaged chiefly in testing of lamps and standards for photometric work. A large increase in the work in illuminating engineering would be of great value both to the Government and the public.

In wireless telegraphy the Bureau ought to maintain a first-class laboratory, devoted to the determination of the fundamental facts needed by the various departments of the Government making use of wireless telegraphy. With the present limited equipment and personnel engaged in this work the Bureau has been assisting the Bureau of Navigation and, to some extent, other bureaus of the Government making use of wireless telegraphy.

ELECTROLYSIS.

An investigation was completed on the damaging effects of earth currents upon gas and water pipes, cable sheaths, reinforced concrete, and other underground structures. The results of these investigations are being published, and the Bureau is now in a position to make practical use of the results of these investigations. In such cities as St. Louis, Chicago, Philadelphia, and other large as well as many smaller places where the overhead trolley is used in the street railway system, this problem of electrolysis is a very serious one, and the Bureau is in a position to render valuable service in solving local problems.

GAS INVESTIGATION.

The Bureau's investigation on the testing of gas and the regulation of gas service has yielded very valuable results. A thorough revision of the Bureau's publication on this subject is nearly completed. This work is of very highest importance to cities that regulate the gas service for themselves, and to State commissions, as well as to the gas industry.

PUBLIC-SERVICE COMMISSION WORK.

In many branches of public-service commission work, including electric light and power, street and interurban electric railway service, and telephone service, the Bureau has been of great assistance. Its facilities and personnel should be increased to enable it to study

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these problems adequately, in view of the great demand for such advice.

The scientific work of recent years has placed the electrical work of the Bureau on a firm basis, and it is now desirable to develop the engineering side of the work on a scale commensurate with its importance, while at the same time the scientific investigations are continued and developed.

ELECTRIC MEASURING INSTRUMENTS.

The demand for the testing of electric instruments grew steadily during the year. A number of new types of instruments and meters were submitted by the makers for special test. In connection with the testing of electric fans for the Government much progress was made in improving the methods of measuring air delivery. The comparative test of American direct-current watthour meters was completed and the results prepared for publication. New methods of voltage control were worked out for use in the equipment of the new electrical laboratory of the Bureau.

TESTING STANDARD ELECTRIC RESISTANCES.

The testing of standard electric resistances, standard cells, and precision resistance apparatus has proceeded steadily. The investigation on the mercury ohm, the fundamental standard of electric resistance, and an investigation of moving coil galvanometers were nearly completed during the year.

The investigation on the silver voltameter for the standard determination of the unit of electric current has been continued. The third paper of the series giving the results of this important investigation is now in press.

MAGNETISM.

The Bureau's work in magnetism included cooperative work with various organizations along the lines of magnetic testing.

The usual tests have been determinations of total core losses of sheet steel, normal induction of rods and sheet steel, and hysteresis constants of permanent magnet steel. These assist the electrical industry to use the most efficient materials in their manufacture of electrical instruments and machinery. These tests require certain standard sizes of test specimens and involved only standard data for which apparatus had previously been developed at the Bureau and found thoroughly reliable. Other tests have been made for which special apparatus had to be developed or unusual conditions involved greater difficulties. These special tests involved specimens of irregular form, tests of the magnetic properties of the so-called nonmagnetic substances, measurements of temperature coefficients of permanent magnets, and the adjustment and calibration of commercial magnetic instruments not previously investigated.

Investigations have been in progress throughout the year to increase the accuracy of the standard magnetic tests and to broaden their scope. This involved a careful study of existing instruments and the development of new apparatus.

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The investigation of the relation between the magnetic, electric, and mechanical properties of steel has been continued. In this the Bureau had the cooperation of the Pennsylvania Railroad in supplying materials and technical assistance. This research gives promise of a new magnetic test which will clearly indicate the mechanical properties, and has already yielded results of practical importance. Preliminary reports on the program of this work have been made before the International and the American Society for Testing Materials.

Cooperation in the development of specifications for standard magnetic tests of iron and steel has been continued with the American Society for Testing Materials through its committee on magnetic testing. A number of industrial institutions have cooperated in several investigations by furnishing material, apparatus, and data.

PHOTOMETRY.

During the past year a complete recalibration was made of all working standards of light intensity. Special attention was given to the carbon-lamp standards used in the pentane standard lamps, since the values for pentane lamps as based upon them by the Bureau differ slightly from the values assigned to the same lamps in England. The mean value for these carbon standards as determined by different groups of observers at different times during the last three years has been the same to within one-fourth of 1 per cent.

To clear up the slight difference from English values a number of carbon lamps, standardized at a voltage which would give the color of the pentane flame, are being prepared to be sent abroad for comparison with the pentane standards in the English laboratory.

In the last annual report, reference was made to an agreement of the Bureau with the National Physical Laboratory of England to interchange a number of tungsten lamps standardized at an efficiency of about 1½ watts per candle in order to establish the international unit in terms of whiter light than it had been previous to that time. Accordingly, the Bureau standardized a group of 30 lamps and the English laboratory sent over a group of 14 lamps. Seven lamps of each group were then sent back to England for measurement. From the results of this intercomparison thus far obtained it appears that within the limit of errors of measurement the units of the two countries, as interpreted through the medium of high efficiency lamps, are in agreement.

During the year there were standardized for the general public and the Government departments and State institutions 71 carbon, 8 metallized carbon, and 314 tungsten lamps, or a total of 393 lamps. Standardization of lamps was undertaken for use by the Baltimore & Ohio Railroad and the Post Office Department, with whom the Bureau cooperated in an investigation of postal-car lighting.

In commercial lamp testing 1,283,000 lamps were inspected for the various Government departments. Of these 651,000 were carbons and metallized carbons, while 632,000 were tungstens. During the previous year (1911–12) 1,221,000 lamps were inspected; of these 847,000 were carbons and metallized carbons and 374,000 were tungstens. The proportion of tungstens increased from about one-third to one-half of the total. The total number of lamps life tested

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during the past year was 4,889, of which about one-half were tungstens. During the previous year (1911–12) 4,180 were life tested, of which one-fourth were tungsten lamps.

The work on flame standards has been devoted almost entirely upon pentane lamps. A large number of these continue to be wanted for gas testing in various cities. The Bureau's work has been the standardizing of lamps for this purpose, and experimental tests with a view to prescribing the best methods of operating the lamps. The observations made during the past two years confirm exactly the corrections previously determined at the Bureau for the effect of atmospheric moisture on these lamps. New apparatus has been designed to facilitate routine tests, and to determine more exactly the effects of barometric pressure on the pentane lamp and on other flames. A comparison of various types of standard gas burners to determine which should be recommended for gas testing is desirable, and a beginning has been made in this work.

Besides ordinary tests of portable photometers the Bureau has calibrated a special photometer for the Weather Bureau, making necessary modifications to adapt the instrument for the measurement of daylight of all intensities up to direct sunlight.

A double-mirror selector for the measurement of the distribution of light about lamps and reflectors has been designed and built. A large number of such measurements were made in connection with the investigation of postal-car lighting carried out by the Baltimore & Ohio Railroad and the Post Office Department, referred to above. A number of reflectors were tested also for the Navy Department, which has used the results in its specifications and will hereafter send samples of reflectors purchased by that department, to be tested at this Bureau.

Some attention has been given to street lighting and railroad headlights and signals. During the year the Bureau made a number of tests (both in the laboratory and on the street) of the gas lamps used in Washington. Assistance was also furnished for tests in Philadelphia. The work of the year on headlights and signals has included tests of the candlepower of electric arcs for headlights, and of the transmission of a set of standard signal glasses, and the preparation of a report on proposed headlight legislation, this report being based largely on the experimental work of previous years.

WEIGHTS AND MEASURES.

This year offered the first opportunity for a systematic study of the gold-plated working standards in five years, and the results indicate that the more important standards upon which the work of the Bureau is based did not suffer any change greater than one part in ten million. An investigation of the effect of use and the corrosion of nickel steel and monel metal weights showed that weights made of these materials are far superior in constancy and appearance to plated or lacquered brass weights; the use of these materials is recommended for sealers and others where constancy under continued handling is desired. The routine testing of length, mass, and volume has been carried on in a satisfactory manner. Several investigations or improvements in the methods of testing do, however, merit notice. The cement sieve investigation, begun last year, was

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completed, and yielded satisfactory results. During the year an opportunity was offered to make a careful calibration of the mass weight standards of the Bureau.

EXPANSION OF MATERIALS.

The equipment for the determination of the expansion of materials from room temperature to 700° C. (1,260° F.) was completed during the year, and the expansion of a number of specimens of steel and nickel-steel alloys were determined. This equipment will be supplemented by apparatus for determining expansion from the temperature of liquid air up to about 300° C. The plans for this apparatus have been completed and considerable work has already been done in the shop, so that there is every prospect that the Bureau will secure during the present year facilities for determining expansion from the temperature of liquid air to 700° C. The apparatus for the determination of expansion at high temperatures has been described, and will shortly be published in the Bulletin.

CEMENT SIEVE TESTING.

The cement sieves are used in the testing of cement to determine the fineness of grain. The necessity for accurate sieves is apparent when it is considered that the most valuable part of Portland cement is that which passes a 200-mesh sieve, and that all Portland cement purchased for the construction work of the United States Government must meet the requirement that 92 per cent shall pass a 100-mesh sieve, and 75 per cent shall pass a 200-mesh sieve. Entirely new methods for testing sieves have been devised which greatly facilitate the work, and also greatly reduce the probability of errors. The manufacturers of such sieves availed themselves of the results of this work and in consequence they are now making a much better grade of sieves.

ANEROID BAROMETERS.

Satisfactory progress was made in the investigation of aneroid barometers, and a report embodying the results of the study of instruments of practically every make and style on the market will be published during the coming year. A knowledge of the action of aneroid barometers which are oftentimes the only means available for determining elevations is of great importance at this time on account of the activity of the army and navy, as well as the public, in the field of aviation. Correct instruments of this type are also required by the various Government surveys, and by Army engineers.

COOPERATIVE WORK WITH STATES AND INSPECTION OF COMMERCIAL WEIGHTS AND MEASURES.

A number of States introduced weights and measures legislation designed to create inspection systems of the weights and measures in commercial use or to amplify and amend laws already on the statute books. In a number of cases these bills were referred to this Bureau for criticism and necessary amendments. Among States as-

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sisted in this way are the following: California, Illinois, Indiana, Iowa, Kansas, Michigan, New Hampshire, Pennsylvania, and Texas. All of these bills received careful attention, many of the sections being revised and some being completely rewritten, with the idea of securing the best legislation possible and of conserving uniformity in the provisions of the statutes of the various States.

As the best means of securing these ends the model law formerly framed by this Bureau and adopted by the Sixth Annual Conference on the Weights and Measures of the United States was followed insofar as local conditions would permit. A number of these suggestions were accepted and several of the rewritten bills were afterwards enacted into law. During the year the model law was carefully revised and eight new sections were added thereto. It was also presented in two new forms to meet the requirements of all classes of States. These amended copies were presented to the Eighth Annual Conference on the Weights and Measures of the United States and were adopted by that body and recommended for passage in those States not yet having a satisfactory code of laws.

PARCEL-POST SCALES.

In October the Post Office Department let contracts for 30,200 scales for use in the Parcel-Post Service, then about to be established. At the request of that department the Bureau assisted in the preparation of specifications, tolerances, etc., and examined and criticized the various models submitted. Afterwards test of the individual scales was made by representatives of the Bureau at the factories of the various manufacturers. The results of these tests were conclusive proof of the necessity of the inspections and resulted in greatly improving the character of the product and in preventing the delivery of many thousand seriously faulty scales.

When it was decided to purchase 50,000 additional scales the Bureau again assisted the Post Office Department in the same way. The inspection of the first two orders, consisting of 25,500 scales, has been nearly completed and once again our inspectors have rejected many thousand incorrect scales and have thus greatly improved the character and accuracy of the product. The study of the variations of spring scales resultant on temperature changes was continued by conducting tests on various types of compensating devices submitted by manufacturers and by investigating the efficacy of various combinations of metals which might be used in these devices.

TOLERANCES AND SPECIFICATIONS FOR COMMERCIAL WEIGHTS AND MEASURES.

The Bureau was represented upon a committee on specifications and tolerances for weights and measures appointed by the conference on weights and measures, and the report of the committee which was accepted by the eighth conference will be used as the basis for specifications and tolerances to be published by the Bureau. Copies of the report of the committee have been sent to practically every manufacturer of such apparatus with the request that they give the Bureau the benefit of any criticisms they may desire to make. Un-

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fortunately the demands from the States for such specifications and tolerances has been so urgent that a number of the States have not been able to wait for the criticisms, and the mature consideration of the matter by the Bureau. It is, however, believed that the specifications and tolerances as accepted by the conference were a decided advance, and that no serious mistake has been made by their premature adoption by the States. In fact, there is some advantage in giving them a trial before their final adoption by the Bureau.

WEIGHTS AND MEASURES CONFERENCE.

The Eighth Annual Conference on Weights and Measures was held at the Bureau in May of the present year, and in point of attendance and the character of the program was superior to any heretofore held. Twenty-five States and 29 cities were represented, and also the attendance of a number of railroad-scales inspectors and manufacturers of weighing and measuring apparatus contributed very materially to the success of the meeting. Papers on the following subjects were presented: "Report on legislation during the year;" "The operation of the New York City serialization ordinance;" "Testing of gas meters;" "Testing of water meters;" "Design of scales;" "Experiments on scales and weighing, and technical features of scale action and construction." A full report of the proceedings of the conference will be published during the coming year.

Plans and specifications for the railroad-track scale testing equipment provided for during the year by Congress were sufficiently advanced to enable the Bureau to give the contract for the main part of the equipment to A. H. Emery, Glenbrook, Conn., in March, and at this time the construction of the equipment is well under way. This equipment is radically different from anything heretofore used for testing railroad-track scales. It has been customary for the railroads and others to use a practically solid iron car with a short wheel base, weighing anywhere from 25,000 to 80,000 pounds, as a portable standard weight which could be attached to the rear of trains when transported from one scale to another. The wheels, brakes, etc., of such a car form part of the standard, and consequently any wear and tear upon them affects the test weight.

Where master scales are maintained at intervals on any railroad system on which the weight of the test car can be frequently verified, this is not a serious defect, but where a car might have to be transported from one part of the country to another over several roads, some of which may not have proper facilities for checking the weight of the car, in order to be independent of changes in the running gear caused either by wear or by reason of the fact that a pair of wheels or brakes might have to be replaced, the testing equipment of the Bureau is carried in a specially constructed box car which is provided with an electrically operated crane for handling the equipment. The testing equipment consists of eight 10,000-pound weights, four 2,500-pound weights, and two hundred 50-pound weights, and a truck upon which all or any part of the standard weights may be loaded. The truck will be operated by a worm gear by electric current generated by a 10-kilowatt dynamo driven by a gas engine in the box car.

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Auxiliary apparatus will be carried to enable a scientific study of track scales to be made, e. g., upon the flexure of the beams and foundation of the scales under varying loads. In order to place the Bureau in closer touch with the large scales and weighing problems several such scales at important points were visited during the past year. The grain elevators in Baltimore, Md., which are periodically tested under the jurisdiction of the Chamber of Commerce, were also inspected. The factories of several representative scale manufacturers were also visited and details of the construction of large scales were studied. The study of the situation showed the limitations of the common methods of constructing, testing, and maintaining scales, and developed the fact that there was no practice recognized as standard and that local conditions varied greatly according to the character, training, and experience of the men supervising such work. The general information obtained has been used in planning the test weight car equipment to be provided for the Bureau.

The subject matter of the investigation to be conducted with the aid of the test car has been considered and the detailed test to be applied to scales to clear up disputed points and to obtain data for planning the design and construction of scales on a uniform engineering basis has been outlined. Several papers upon the theory and design of scales were prepared for the Eighth Annual Conference on Weights and Measures. In view of these demands, and the inadequacy of the present force to meet them, it is recommended that a special appropriation be asked for the testing of railroad-track scales, elevator scales, and other scales used in weighing test shipments by the Government in its transactions with the public, such as post offices, navy yards, customs scales, etc.

The question of testing railroad-track scales and elevator scales is one that should be taken care of by the Federal Government rather than by the States, for the reason that practically everything weighed upon them is shipped from one State to another, and thus becomes subject to interstate commerce laws. Moreover, it is a matter that has never been taken up except by a few States, and consequently there is afforded a splendid opportunity for the Federal Government to set a standard of inspection for the States to follow. It will be necessary to provide some increase in the equipment and personnel of the weights and measures division during the coming year. The Bureau has been called upon to investigate the scales and methods used in the weighing of various commodities, such as cotton shipments in Texas; corn oil shipments in Louisiana and Chicago; coal and grain shipments in Pennsylvania; grain shipments in New York; belt conveyor at Annapolis, Md.

The Bureau has for a number of years urged the States to establish weights and measures inspection for the protection of the purchasing public, and half of the States are now spending from $10,000 to $35,000 each for this purpose. On the other hand, little or nothing is being done by the Federal Government to insure the accuracy of its own scales, although there is ample evidence that some of them at least are among the poorest in use. The Federal Government should set an example in this respect by the establishment of an inspection service which will periodically inspect all Government

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scales used in dealing with the public, and should cooperate with the State weights and measures officials in bringing about uniform methods of inspection. The Bureau has already done a vast amount of good in this direction through the National Conference on Weights and Measures, but its value to the States could be greatly increased by keeping in closer touch with the conditions in the States.

In view of the conditions of railroad-track scales disclosed by the investigations of the Interstate Commerce Commission and the Bureau of Standards, and the resulting activity on the part of the railroads in the installation of heavy scales, the recommendations of the Interstate Commerce Commission, which are reasonable enough, provided that they should be performed by this Bureau, and are as follows: That Congress confer authority to fix points at which track scales shall be installed; to prescribe their standard; to test or to supervise the testing, and to supervise the operation of scales. To provide for even the most superficial inspection of railroad and elevator scales, such as is recommended by the Interstate Commerce Commission, several test car equipments will be necessary, and the Bureau should lose no time in supplying the demand for correct railroad and elevator weights.

THERMOMETRY, PYROMETRY, AND HEAT MEASUREMENTS.

THERMOMETRY.

During the past year 791 mercurial thermometers and 13,051 clinical thermometers were tested. These included a large variety of thermometers, e. g., 269 calorimetric and Beckmann thermometers used in determining the heating values of fuels as a basis for large purchases of fuel on specification and in the researches of scientific and technical laboratories; 447 laboratory thermometers ranging from below 0° to 550° C., used for general laboratory and technical purposes; 25 hydrometer thermometers; 41 thermometers designed for special uses; 9 clinical standard thermometers used as standards by manufacturers for the graduation of clinical thermometers; 41 electrical resistance thermometers used for various purposes, e. g., for inspection and investigational work in measuring the temperature of refrigerator cars by one of the Government bureaus, for measuring small temperature changes in calorimetric work of the highest precision, for use as standards in industrial laboratories, for testing thermometers to be used in engineering tests, etc.; and two differential thermocouples for measuring temperature differences in the interval 0° to 40° with an accuracy within a few thousandths of a degree.

Of the clinical thermometers submitted 7.5 per cent were rejected for various causes. These thermometers were submitted by the manufacturers, the several medical bureaus of the Government, hospitals, druggists, physicians, and individual users. Although the total number of clinical thermometers tested represents but a small percentage of the total annual product, experience has shown that it is sufficient to serve as an excellent check on the accuracy of the present day product. This, taken with the practice the Bureau has adopted for some years of sending some of its own standards periodically to manufacturers, has notably improved the accuracy and reliability of the product.

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Some progress was made on the investigation of primary standard mercurial thermometers intended for use as standards in the interval 200° to 500° C., including the calibration of their scales and the determination of the effect of temperature on their pressure coefficients. This extension beyond the standard interval from ice to steam point is of special value industrially.

A special electrically heated thermometer comparator was built in the instrument shops for the testing of thermometers in the interval 300° to 600° and has been used with much success when very uniform temperatures are required through a region of considerable volume.

A paper on thermometric lag, with special reference to its effect on precise differential temperature measurements in calorimetry, was published during the year.

As stated in previous reports, a considerable part of the apparatus required for the "porous-plug experiments" has been designed and assembled. This investigation is of fundamental importance in the establishment of the standard scale of temperature and its completion would constitute a notable contribution to the field of thermometric measurements. This investigation has been carried about as far as is possible by a single experimenter.

Progress has been made in the negotiations with the national standardizing laboratories of England, Germany, and France, with a view to international agreement on the standard temperature scales to be used by the several institutions. There is every prospect of a satisfactory agreement.

In some industries having to do with chemical distillations, the character of the various distillates depends on the rate and temperature limits of the distillation. At the request of the chemists of these industries and of members of standardizing committees of chemical societies interested in this work, some experiments were inaugurated with a view to reducing the uncertainty in the temperature measurements as they are ordinarily made in standard forms of distillation flasks and with different types of thermometers.

CALORIMETRY.

During the year 152 standard combustion samples of sugar, naphthalene, and benzoic acid were furnished to chemists and engineers for the standardization of combustion calorimeters used for the determination of the heating values of fuels. The general use of these samples has relieved the Bureau of the necessity of testing great numbers of calorimeters which it would undoubtedly have been called on to test if these samples were not generally available. By the use of these samples the chemist is enabled to check in a few minutes the constants of his entire calorimetric equipment, and the accuracy of his experimental methods, a check which can, therefore, be frequently made and which has done much to reduce all calorimetric or fuel value testing to a uniform basis throughout the country. When this work was begun the Bureau's attention was frequently directed to the settlement of disputes between the buyer and the seller of fuels, arising from the different results of tests made in different laboratories. For example, in one instance involving a large fuel contract, based on the heating value of the coal furnished, the difference in the results of the two tests made in different labo-

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ratories amounted to $25,000 per year in the settlement as made on the basis of one or the other of the tests.

This difference was traced to an error of a few hundredths of 1 degree in the thermometer used in one of the tests. If these standard combustion samples had been available at that time, the party in error would have been able to detect the error by simply burning a weighed amount of the standard sample in his calorimeter and observing whether the resulting heating value differed appreciably from the value given in the Bureau certificate accompanying the standard sample.

The water equivalent of one calorimeter of the bomb type was determined in this section and several gas calorimeters that had been used in important investigations were compared with the Bureau's standardized calorimeters.

Several years ago the Bureau developed a type of electrical resistance thermometer especially adapted to the measurement of the temperature changes met with in calorimetry to an accuracy considerably greater than is attainable with any mercurial thermometer. The results of some improvements in the construction of the above type of thermometer have been described in a paper which is now in press. A considerable demand has arisen for these thermometers, which are now being regularly made by a well-known American instrument maker, in accordance with specifications published by the Bureau. Thermometers of this type, together with the accessory apparatus required in their use, have been installed in numerous industrial laboratories, in scientific laboratories requiring the highest accuracy of measurement, and in some bureaus of the Government. Five of these thermometers were standardized during the year and as many more are now under test.

Considerable progress was made during the year on the investigation of industrial gas calorimeters. It is hoped that the first installment of this investigation can be completed and published in the next few months. The results of this investigation, undertaken at the request of the leading gas engineers, will, it is believed, be of immediate practical importance to gas engineers, inspectors, and public-service commissions, in view of the rapid adoption of heating value standards in place of photometric standards for specifications of quality of gas delivered under contracts and public franchises.

Experimental work has been done on the determination of the capacity for heat of water at different temperatures, and on the temperature coefficient of the specific heat of copper. These investigations are fundamental to the science of measurement of quantities of heat.

Preliminary determinations of the specific heats of milk and of samples of cream for one of the Government bureaus were made in this section.

A special comparator switch was designed and built for the intercomparison of calorimetric platinum resistance thermometers where an accuracy of a few ten-thousandths of a degree is demanded.

PYROMETRY.

The pyrometric testing included 25 rare metal and 8 base metal thermocouples; 6 pyrometer galvanometers; 11 optical and radiation

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pyrometers; 2 platinum resistance thermometers; 28 melting points of fire bricks, furnace slags, and miscellaneous materials; 3 fireproofing liquids; 3 miscellaneous high-temperature tests; and 191 metallurgical tests, including 5 heating and cooling curves, 63 microphotographs, and 123 heat treatment tests (hardening, annealing, and tempering).

The high-temperature instruments tested were submitted by many different industries in which the control of temperature is an important factor in the quality of product, such as in foundry operations, in the hardening and annealing of steels, in ceramic processes, etc., by technical testing laboratories, and by scientific-research laboratories. Manufacturers of all types of pyrometers are now regularly submitting their standards to the Bureau for test, with the result that one standard scale of temperature is now coming into very general use in the industries, contributing materially to the accuracy of specifications, the reproducibility of product, and the advantageous interchange of experience.

A technologic paper on the melting points of 62 samples of fire brick and of materials of importance in the manufacture of fire brick was published by the Bureau during the year. The experimental work on the melting points of a number of refractory oxides was completed during the year and the results will be published in the near future. This work has shown that some of the hitherto generally accepted melting points of those refractory materials are in error by some hundreds of degrees. Most of the apparatus required for the determination of the thermal conductivity of refractory materials at very high temperatures has been designed, constructed in the Bureau instrument shops, and assembled in the laboratory.

Papers were prepared on "Some characteristics of total radiation pyrometers," "The calibration of optical pyrometers," and "The cold-junction correction for thermocouples."

Much experimental work was done on the monochromatic and total emissivity of iron and nickel and their oxides to furnish data to users of radiation pyrometers, enabling them to reduce observations with these instruments to true temperatures.

A micropyrometer for measuring high temperature melting points (above about 700° C.) was developed during the year and applied to the determination of the melting points of a number of the refractory elements of atomic weight from 48° to 59°. The results will be published in the Bulletin.

Several new furnaces have been designed and installed during the year for special tests and investigations. One of these furnaces has been used in determining the loss in weight of platinum ware when exposed to various high temperatures for various lengths of time, a question of great importance in precise analytical operations carried out in platinum vessels.

OIL TESTING.

Viscosity, flash-point, and fire-point tests were made on 184 samples of oils submitted by various bureaus of the Government. Some work was done on the intercomparison of several makes of viscosimeters widely used in oil testing.

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REFRIGERATION CONSTANTS.

In view of the late date of authorization of this investigation and the considerable time required to fill the new positions, experimental work could not be taken up until the year was well advanced. Nevertheless, important progress can be reported at this date. A systematic program of work was planned after consultation with an advisory committee appointed by the American Society of Refrigeration to cooperate with the Bureau. In accordance with this program the first important constant, the determination of which was undertaken, was the latent heat of fusion of ice. This work required a very large amount of special apparatus, which, however, was fortunately at hand, having been developed to meet the requirements of previous calorimetric investigations, so that experimental work could be immediately instituted. At the time of writing the experimental work on this constant has been nearly all completed and it is hoped that the results will be communicated to the forthcoming International Congress on Refrigeration to be held in Chicago in September, 1913. Two quite independent methods of determining the constant were used and the results by the two methods are in most satisfactory agreement.

Other constants of fundamental importance in the field of refrigeration engineering are the physical constants of the liquids and vapors mainly used in refrigeration machinery, viz, anhydrous and aqua ammonia, carbon dioxide, methyl chloride, etc. These constants are the latent heats, specific heats, specific volumes, vapor pressures, densities, etc. A very large part of the special apparatus required for the determination of the latent and specific heats of these liquids has been designed and constructed in the instrument shops and is now being assembled in the laboratories. A special comparator is being constructed to determine the coefficient of expansion of ice. Different methods of preparation of the above liquids are under investigation. A carbon dioxide compressor has been installed to provide means of attaining the low temperatures required in these investigations. All the work has been planned with a view to the determination of each important constant by at least two quite independent methods to insure the highest reliability to the results of the work. Great experimental difficulties are sure to arise in an investigation of this kind, so that it is difficult to fix any date for the completion of such work, but it is expected that important progress will be made during the present year.

The third stage of this investigation relates to the thermal conductivities of insulating and building materials and of types of construction used in refrigeration structures. It was deemed best to defer the inauguration of this work until the work outlined above was further advanced and until an opportunity had been afforded to test the apparatus that has been constructed and methods that have been adopted.

METALLURGY.

The work in metallurgy, which will hereafter be organized as a separate division, has been particularly effective during the past

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year. All divisions of the Bureau have cooperated in this important field. The following is a statement of progress at the Bureau in metallurgical and allied investigations and testing during the past year, with a list of recent publications, and an account of work in progress:

A thermal and microscopic study has been made of a series of commercial steels. During this work new and improved apparatus was developed for taking heating and cooling curves of steel in vacuo. The two series of experiments gave results in agreement and have added considerably to our knowledge of the iron-carbon system containing impurities.

A simple method of calibrating optical pyrometers, suitable for works practice, has been devised and a study made of the cold junction correction to thermocouples, which is of importance for works practice.

What is probably the purest iron in existence has been made at the Bureau. A study of the methods of producing this pure iron on a large scale is being undertaken by improved electrolytic methods. This substance will be of inestimable value in making up pure alloys of iron. It has been possible also to make crucibles here for melting this iron without introducing impurities into the metal.

Using samples of nearly pure iron from several sources, a study of the critical ranges (A2 and A3) is being made by the method of heating and cooling curve. This investigation is of great scientific interest, as the question of the allotropy of iron has long puzzled metallographists. It is believed that our sensitive and accurate experiments will go a long way toward settling this elusive problem. The elucidation of the nature, variations, and location of the critical ranges in iron is also of practical metallurgical importance, as the rationale of the heat treatment of iron and steel is dependent on these phenomena. This work for pure iron is practically completed. Whether pure iron, and also steel, possesses critical ranges below 700° C. is again a moot question. A study of this has been begun, using several methods. Several hundred steels are being studied for melting points, emissivities, etc., and may be later examined for other physical properties. These steels are of peculiar interest, in that a great many measurements of electrical, magnetic, and mechanical properties have already been made on some of them by others. Work is also being continued on the melting points of the refractory elements, and it is hoped to determine this constant with exactness for all the refractory chemical elements available.

The Bureau has been greatly aided in this work by the willingness of chemists, from all over the world, to contribute samples of the pure elements they have prepared. Preliminary results have been obtained with Os, Ru, Rh, Ir, Mo, Be, B, Nb, Er, Th, Y, and Zr. Some preliminary work on iron-silicon alloys has been begun with the idea of ascertaining the possibility of reducing silicon from pure silica and alloying the silicon and iron. Also work has been started on an investigation of the variations in apparent carbon content of steels with temperature, size of grain, rate of combustion, purity of oxygen, heat treatment, etc. The preparation of pure carbon-iron alloys has been begun, as well as a study of the wearing qualities of

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monel metal and the behavior of enameled apparatus and of a sherardizing plant. There is a wide field here for important work.

A study of the loss in weight of platinum ware when heated is under way for a committee of the American Chemical Society. This has required the construction of a special furnace and satisfactory preliminary results have already been obtained.

An investigation of considerable experimental difficulty and of importance to metallurgical practice is nearing completion on the radiation from metals and oxides. The data obtained will permit giving exact correction to the various optical and radiation pyrometers when sighted on these materials.

Another problem of practical metallurgical importance is the question of rolling temperatures of steel rails. Measurements have been obtained of the practice in four large rail mills, and the results will soon be published with accessory data on the properties of the rails. This work is but preliminary to taking up, if facilities are provided, the vitally important question of the quality of rails.

MISCELLANEOUS.

As in past years an important feature of the work of this division has consisted in furnishing to representatives of many different industries information relating to thermal constants, methods of temperature measurement adapted to the requirements of specific problems, the design of special apparatus to enable large industrial laboratories to do their own routine testing, the Bureau being thus relieved of doing much of this testing, it being only necessary to test the standards of these laboratories. Information was also furnished to a number of laboratories, both industrial and in the Government departments, on specifications for high-grade mercurial thermometers adapted to specific requirements and on complete temperature equipments for scientific work requiring high accuracy. At the request of the Navy Department a member of this division delivered a course of lectures on "Technical thermodynamics" before the post graduate department of the United States Naval Academy. The stenographic notes of these lectures have been printed by the Navy Department for the use of the officers of the fleet.

A member of this division has made a careful study of the "Principle of similarity," a particular view of the theory of dimensions. The study was undertaken, in view of the fact that there appears to be no publications where this principle has been at all completely and clearly set forth and illustrated. This principle is of the utmost importance and utility, especially in experimental hydro and aero dynamics. The advisory committee of the Langley Aerodynamical Laboratory has requested that the part of the paper relating to aerodynamics be submitted for publication by that committee. The complete paper on its completion will be published. A special chapter of the study referred to above relates to an analysis of existing experimental data on the windage of steam turbines, and a paper on this subject will soon be submitted for publication.

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OPTICS.

APPLIED OPTICS AND SPECTROSCOPY.

Image-forming instruments.—Image-forming instruments, including telescopes, microscopes, photolens, etc., were tested during the past year in increasing numbers for individuals and corporations throughout the country as well as for the various Government departments. The systems tested range throughout the field of optics from complete examination of the large submarine periscope, which limits the value of the boat as an instrument of war, to the simple measurement of an aperture ratio for the purchaser of photographic lens.

An investigation of discrepancies between the true aperture ratio of photographic lenses and the marked ratio shows that the purchaser does not always get the marked ratio. The cost and selling price of a photographic lens increase rapidly with a slight increase of this ratio.

Improved methods of measuring the residual aberrations have been devised. The measurement of distortion is extremely urgent when the lens is used for photographic surveying, and has to be capable of high precision.

Considerable has been done upon the aberration tolerance of lenses suited to various purposes. Lenses have been constructed for this purpose and other designs are under way. This is a very complex problem but of considerable importance to both manufacturer and purchaser of optical instruments.

This section has been consulted continuously by the Government departments and by all divisions of the Bureau regarding the proper lens systems for specific work.

An investigation of the errors of a set of microscope objectives belonging to this section has been carried out with the idea of having a standard set for rapid comparison with other objectives. Numerous microscope test objects have been collected together but considerable difficulty is experienced in obtaining those suitable for certain objectives. One series of microscope objectives has been found which give greatly increased resolving power by the use of the 436 line of the mercury arc. This is nearly a 20 per cent increase over that attained with ordinary illumination. A new form of eyepiece has been devised which gives promise of increasing the working field of the ordinary well-corrected objective. A circular on photographic lenses is in preparation.

Photographic optics.—In the many uses of photographic equipment there is a demand for increased resolving power and definition. The resolving power depends upon the plate grain and diffusion in the film. An investigation has been made of the plate grain of many plates of the leading American makers. Photomicrographs to a uniform magnification, both of the developed and undeveloped plates, have been made. The effect of developers upon the growth of the image has been studied and an effort made to determine the best methods of working.

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Refractometry.—Numerous refractive index determinations have been made for manufacturers and others with the precision spectrometer and also ordinary refractometer determinations.

An investigation is under way to determine suitable refractive index standards for use as a check upon the various refractometers in use by manufacturing concerns and the departments of the Government. The physical characteristic of many hundred compounds have been examined with a view to securing permanent liquid standards of the proper refractive indices. It is too early to predict that liquids will be found which are permanent and suitable, but it is hoped that such will be the case. As stated, hundreds of refractive indices have been measured in this search. This is of great urgency because of the continually growing commercial use of the refractometer as a means of rapidly and accurately detecting impurities in liquids.

Spectrophotometry.—The spectrophotometric tests have been limited during the past year to the necessary routine tests of photographic ray filters, etc., because of the very limited force throughout the greater part of this fiscal year. It is hoped that this work may be continued, especially the investigation upon glass absorption of the invisible ultra-violet radiation and of visible radiation.

The work in spectroscopy has been somewhat delayed through the resignation of the specialist in this subject. The position has now been filled and the work is being reorganized.

The study and planning for an absolute determination of the wave length of neon light was given some attention and deferred so that work in calorimetry could be taken up.

The work which will be done in this section during the coming year is part of a three-year program. This program consists in the measurement, by interference methods, of secondary standards of wave length throughout the entire range of spectrum which can be photographed at present. A few standards will be determined with great accuracy in the ultra-violet, and these will be used in measuring ordinary secondary standards and for other purposes. It is hoped that the inert gases of the atmosphere may furnish excellent standards for this purpose. The greater part of the secondary standards will be measured in the iron spectrum and according to the recommendations of the wave length committee of the International Union for Solar Research.

During the coming year it is hoped that the necessary apparatus for this work will be installed and tests and a beginning made on the measurements. The apparatus under construction, or planned, consists of several etalons and a complete outfit of auxiliary apparatus, a measuring instrument of unique design, a spectrograph of great dispersive power for the ultra-violet, and the mounting for a concave grating. Installations for making plates sensitive to the ultra-violet and infra-red are under way.

The demand for the work of this section is very great and is fundamental to all accurate measurements of light waves, and the physicist, the chemist, the astronomer, and the meteorologist alike require such standards. Furthermore, the wave lengths once standardized may be used in making standards of length.

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INTERFEROMETRY.

The chief activity in interferometry has been in the determination of coefficients of expansion of materials. A new method of observation was devised and has been partially tested in practice. A simple formula for change in order of interference due to temperature and pressure changes has been derived and published. New apparatus for temperature control was designed.

In the construction of crystalline quartz apparatus for use in interferometry it became necessary to grind quartz accurately perpendicular to the axis and to test for this adjustment. The methods of construction and testing were studied and the work satisfactorily accomplished. An instrument for testing such quartz plates has been obtained and the Bureau is now prepared to test quartz plates with respect to the orientation of the optical axis.

COLORIMETRY.

Work upon color specification was actively resumed and tentative plans for a spectrum three-color colorimeter were made. An improvised working model was set up and an instrument evolved from this model will be constructed. Attention has also been given to the specification of the color of oleomargarine, and what is hoped to be a practicable method has been outlined and is now being tested. The introduction of bills in Congress and State legislatures aiming to specify a legal limit for the color of oleomargarine has resulted in frequent demands on the Bureau for information and advice on this subject.

The larger part of the recent work has been upon the specification of the color of cottonseed oil. This oil is commercially graded by color, that is, its color fixes the price. Hitherto the methods of testing have been unsatisfactory on account of disputes and contentions between buyer and seller, involving thousands of dollars. The Bureau's work in this field was undertaken in response to an appeal from the chairman of the uniform methods committee of the Society of Cotton Products Analysts. The Bureau has also cooperated in this matter with the chemist's bureau of the New York Stock Exchange. Eleven tests have been applied for and completed. Several hundred Lovibond glasses have been intercompared. Improvements in methods of color testing have been suggested to the cottonseed oil trade and will be adopted. The detailed results of the Bureau's investigation of Lovibond glasses were reported to the annual meeting of the Society of Cotton Products Analysts at Chicago in June, 1913. The improving of these methods will be undertaken by the Bureau in cooperation with that society.

The more urgent needs in colorimetry are a thorough-going experimental study of the trichromatic, monochromatic, and rotary dispersion methods of specifying color; a comparative color study of direct sunlight, diffuse daylight, and some reproducible artificial source (the weather conditions make Washington a quite unsuitable location for studying sunlight and it is desirable that arrangements be made for a period of work at some station of high altitude in a dry climate); a room especially designed for color work and for per-

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manent installation of colorimetric apparatus. Its design should provide for light from any direction and any part of the sky as desired, and for a permanently mounted heliostat. It will probably be necessary to provide additional assistance to carry on routine testing in color specification. The repeated demands on the Bureau for advice in specifying standard colors emphasize the urgent necessity of perfecting our equipment and methods as soon as possible.

POLARIMETRY.

To meet the demands made upon the Bureau the work in polarimetry has been more largely heretofore directed upon those problems which closely unite the Bureau and the public. The polariscope and its accessories are the indispensable adjuncts of the refined sugar manufacturer, the beet and the cane sugar planter, the public sugar chemists, and the customs sugar laboratories. In addition, they are part of the regular physical and chemical equipment used in other industries as well as institutions of learning. This polarimetric apparatus is the product of European manufacturers and is not standardized. The working methods used in the laboratories also vary greatly. The necessity for a Bureau publication dealing with these subjects in a comprehensive manner is evident. A unification of methods as well as a common basis of standardization is necessary in order to bring the results obtained into agreement. With the object of accomplishing this the Bureau has prepared a comprehensive circular dealing with these subjects in a thorough manner and touching upon other lines of the Bureau's activities of importance to the sugar industry.

At the New York meeting of the International Committee for Uniform Methods of Sugar Analysis a representative of the Bureau presented a preliminary paper on the basis of standardization of the sugar testing polariscope. A long and careful investigation by the Bureau has shown that the 100° or 100 per cent pure point for sugar has universally been placed at least one-tenth per cent too high. This relatively large error has caused a loss to the revenue from duties collected on imported sugars of over $500,000 in the last 10 years, the buyer of raw sugar has paid less than he should in the same ratio, and the loss to sugar growers from this source is very large. As a result of the Bureau's work, the International Sugar Commission has appointed a special commission to investigate and make recommendations regarding the matter. The institutions represented on this committee are the Bureau of Standards, the Austrian Sugar Institute, the German Sugar Institute, and the Physikalisch-Technische Reichsanstalt.

An investigation has been made of the values of quartz control plates used by the Bureau as primary standards for saccharimeters. The light source used was the yellow green line (=546.1) of incandescent mercury vapor. The results indicate that previous values were slightly low. The work on the production of monochromatic light of considerable intensity has progressed well.

A large polariscope, designed and built in the Bureau shops, with polarizing and analyzing systems mounted on separate bases, is intended for magneto-optical research in connection with the large electromagnet. A further study of the designs of the perfected sensitive

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tripolarizing system, the most sensitive of all polarizing systems, has also been made.

Several researches, of importance from the scientific point of view, and also because of their bearing on the sugar industry, are now nearing completion. Among these are the purification of dextrose, the influence of atmospheric conditions on sugar tests, and a study of the basic acetates of lead. Many samples of dextrose were prepared with a high degree of purity from commercial glucose and from cane sugar. It has been found that atmospheric conditions exert a marked influence upon sugar polarization, and precautions are now available for avoiding this error.

The research on the basic acetates of lead is still in progress. This investigation is intended to apply to the methods of clarifying raw sugar for polariscopic analysis. The research will throw light on the possible compounds which are all grouped under the title of basic lead acetate.

The supervising of the sugar work of the Treasury Department customs laboratories has been continued, and a number of important changes made, including the introduction of the bichromate light filter and improved polariscope tube. The results have been gratifying. The systematic differences existing for years between the tests of the various ports of entry, as shown by the exchange samples, have been gradually reduced. The Treasury Department, in consequence, has had few contests on sugar importations and has won those in which it has engaged.

Many standard samples of sucrose of high purity were prepared and sent out during the year. The research on dextrose has resulted in the preparation of a standard dextrose of high purity. It is expected that the availability of this substance as a standard reducing sugar will have the effect of increasing the analytical accuracy upon which a number of industries depend. The analysis which determines the reducing power of a reducing sugar is somewhat difficult and unreliable if not carefully controlled, but may be made uniformly reliable if the analyst has at hand a standard substance by which he can verify his work. The Bureau is now prepared to issue standard dextrose samples for this purpose.

The amount of testing was considerably larger than in any preceding year. In all about 1,400 tests were made, many of them in duplicate. This does not include the testing of polariscope tubes cover glasses, over 3,100 of which were examined.

The Bureau desires in every way possible to assist in the development of American made scientific instruments. During the year an encouraging beginning was made with polariscopic apparatus. Standard glassware, polariscope tubes, and a bichromate cell, all of improved types, were designed and are being produced by American manufacturers with gratifying results.

RADIOMETRY.

The choice of the problems to be investigated in radiometry is not always determined by their apparent immediate usefulness. For example, the bismuth-silver thermopile, with opaque receiver, which was designed and made by this Bureau, when first proposed, was considered impracticable. It was constructed and several instru-

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ments made for the public. Now that its practical utility has been demonstrated instrument makers are adopting its principles. One important instrument maker visited the laboratory and was given practical instruction in the construction of this instrument. From present indications it will displace other forms of radiometers for precision work.

The relations of the radiometric work of this Bureau with the public are useful in other ways than the investigation of radiometers and radiation constants. For example, the Bureau has undertaken to maintain a standard of radiation and to issue simple radiation standards in the form of electric incandescent lamps, calibrated so as to give, in absolute units, the energy radiated from the lamp.

The need of measuring photostimuli radiometrically is growing rapidly among physiologists and psychologists, and considerable time is spent in advising them as to equipment for psycopathic hospitals and physiological purposes in general. The high intensity spectroscope ("illuminator"), designed in this laboratory and mentioned in previous reports, with the radiometric attachment has met with success with these investigators, and is serving as a model for instrument makers. Other advisory work has been done in connection with meteorologists and astronomers engaged in solar radiation work; also beginners in radiation work in various colleges find it convenient to apply for advice and assistance. These are illustrations of the ways in which the Bureau, through its radiation work, keeps in close touch with the public, as affecting particular groups of investigators.

In a broader sense radiometry is useful to the public through the investigation of the constants of radiation of the so-called "black body" (a uniformly heated inclosure). During the past year data on the first part of this investigation were computed and are now in press. These data pertain to the constants of spectral radiation for temperatures to 1,400° C. The results are of the greatest importance in pyrometry and spectroscopy.

A vacuum furnace has been constructed for attaining higher temperatures. Progress has also been made in the construction of apparatus for measuring, in absolute value, the total radiation of a black body, and considerable preliminary work has been done on this subject. Thick quartz plates, ground plane parallel, have been obtained for investigating the capacity of quartz in the infra-red. This is necessary before work can be done on the radiation constants at high temperatures, which requires quartz prisms.

The investigations on "Selective emission of various substances" and "The diffuse reflecting power of various substances," mentioned in previous reports, are now in print. A "Summary of recent investigations of the constants of radiation" (this is a critical analysis of the methods, data, etc.), also minor papers on "Radioilluminator attachments," "Tests of thermopiles," etc., have been published.

The short focus, high intensity quartz lens spectrometer (illuminator) has been remodeled and is now being used in obtaining standard spectral energy curves of incandescent lamps, which have been submitted for test. This apparatus is being used also for determining standard spectral energy curves in the visible spectrum. As a standard source of radiation which is easily procured by the public

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the acetylene flame is used. Vacuum tubes filled with helium gas under a standard pressure are also to be investigated.

At the present time the calibration of incandescent lamps, as "radiation standards," is being completed. It is hoped to make some preliminary measurements on the constants of total radiation in absolute value, before there is a change in the temperature conditions within and without the optical pyrometer, and making other preliminary tests, the work on spectral radiation constants, at high temperatures with the vacuum furnace, can not be resumed before fall or winter.

CHEMISTRY.

The routine work in chemistry has shown little change in amount from that of the previous year in spite of a reduction in the number of samples submitted by the general supply committee, and of irons and steels by the Isthmian Canal Commission. These losses have been made up in other materials from the Canal Commission and by an increase of testing for other branches of the Government service. As compared with the previous year the routine work has been handled with somewhat more dispatch, so that complaints on account of delay have been fewer. This improvement has been brought about in part by increasing the efficiency of appliances and the rapidity of a few methods of testing.

Listed by sources, the distribution of routine tests was approximately as follows: Treasury Department, 2,815; War Department, 2,400; Navy Department, 65; Department of Commerce, 482; Post Office Department, 34; United States congressional committees, commissions, and miscellaneous institutions, 373; Government Printing Office, 2,057; State and municipal institutions, 53; private parties, 132; in all, including other departments and parties, 8,446 chemical analyses and tests.

Classified by character of material, the tests were as follows: Irons and steels, 1,170; coated metals, 318; metals and alloys other than iron and steel, 490; cements, 915; asphalt and coal tars, 244; asphalt felts, etc., 109; linseed oil, 270; oil driers, 180; paints and paint materials, 803; varnishes, 367; lubricating oils, 162; rubber, 651; vulcanized fiber, 21; paper, 2,237; inks, printing, 66; sealing wax, 38; flax packing, 34; asbestos, 95; miscellaneous, 61.

ANALYZED SAMPLES.

Early in the year a new material was added to the Bureau's list of analyzed standard samples, namely, sodium oxalate for use in standardizing oxidimetric solutions. Two new acid open-hearth steels with 0.8 and 1.0 per cent carbon were added late in the year. A few renewals were prepared for several exhausted samples. That the demand for these samples is growing is shown by 1,467 samples of irons and steels furnished during the past year, as against 955 furnished during the year preceding, 190 samples of ores as against 136 during the previous year, and 200 of the new sodium oxalate samples. None of the latter were furnished during the previous fiscal year. The net increase amounted to about 50 per cent.

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The Bureau is about ready to issue a rolled brass standard sample. The delay is attributable to inability to secure satisfactory agreement among the cooperating analysts. The Bureau will on this account probably restrict cooperation greatly or dispense with such outside analyses altogether in future for materials with which our chemists have acquired sufficient analytical skill, or where experience shows that great delay is to be expected. This course we shall adopt with regret, for experience has shown that cooperation is of great value, both to ourselves and to the participants outside the Bureau.

A date for issuing the cast brass can not be given until a way is found for securing a sample of satisfactory homogeneity. Efforts will be made to solve the problem at the Bureau's Pittsburgh laboratory by experimenting with different conditions of casting, in the hope of receiving a material that will resist oxidation in the operation of mixing.

RESEARCHES COMPLETED.

The results of several researches have been published during the year, certain of these being the results of cooperative work with other divisions of the Bureau, as follows: Atomic Weight of Bromine; The Chemistry of the Filter Paper Voltameter and the Explanation of Striations; Density and Thermal Expansion of Ethyl Alcohol and its Mixtures with Water; Legal Specifications for Illuminating Gas; The Determination of Sulphur in Illuminating Gas; Evaporation Test for Mineral Lubricating and Transformer Oils; The Sampling of Rubber Goods; Preliminary Note on a New Method for Direct Determination of Rubber; Determination of Phosphorus in Steels Containing Vanadium; Note on the Use of Benzoic Acid as a Standard Material; The Constitution of Aluminates.

New editions have been prepared of the circulars relating to the standard samples, which have engaged the attention of several chemists. Tentative methods for the determination of moisture in coal, suggested by the head of the division, were published in a technical journal.

RESEARCHES IN PROGRESS.

Research is in progress upon the aluminium, with special reference to application in the analysis of phosphate rock. The work on lubricating oils now in progress is much hampered by the amount of routine work. It is hoped to secure valuable information in the course of testing deliveries of oil to the Government departments and other offices. Much work has been done on methods of rubber analysis.

The determination of certain physical constants of alcohol has continued and assistance given to the research on refrigeration constants. Cooperative work with the American Society for Testing Materials has included the analysis of a series of pure raw linseed oils of known origin obtained from domestic, South American, and East Indian sources. As a result a specification has been presented to the society for adoption. The Bureau has also conducted similar analyses on 5 types of boiled linseed oil, 11 soya bean oils, and 8

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Chinese wood oils to determine their constants so that limits can be specified. It will be necessary to develop special tests to identify these oils, either alone or in mixtures. Analyses will be undertaken on a series of turpentines of known origin to develop standard methods of test and specifications.

An investigation has also been started to develop standard methods of analysis of pigments. A number of commercial white pigments and extenders have been carefully analyzed by several methods, both in this laboratory and in that of the Bureau of Chemistry. The method used in both laboratories show concordant results. The investigation will be continued to include most of the commercial pigments. It is intended to conduct a series of exposure tests on paints for metal protection, since it is only necessary to confirm by several series of exposures the data obtained in previous tests. In an endeavor to devise a more satisfactory method than we now have of determining the quantity of oil and gum present in a varnish some work has been done in determining the normal glycerine content of raw linseed oil and the effect of heating on this quantity.

The investigation to ascertain the changes produced in cement mortars and concrete exposed to sea and alkali waters is being continued. This will include the analysis of a large number of samples of set mortars and concretes which have been exposed to these agencies. An effort will also be made to determine the hydration which occurs in the setting of cement, since it is believed that this determination will afford a measure of the cementing value of the material. The investigation of waterproofing and damp-proofing materials used in building construction will be continued in the endeavor to develop tests to show the value of these materials and aid in formulating specifications.

There are a number of other minor investigations aiming at an increase in the efficiency of the methods of testing now in use which are constantly under consideration.

ENGINEERING INSTRUMENTS.

During the year some 200 water-current meters of various types were calibrated for the United States Geological Survey, the Reclamation Service and other Government departments, and State water supply commissions. An increasing number of private water and power companies and engineering firms are sending their current meters to the Bureau for rating. The construction of a 400-foot testing tank for the rating of current meters has been brought well toward completion and will provide the facilities for much needed investigative work of the characteristics of these important instruments. Sixty-eight steam, vacuum, and air gauges, and special gauges for paper-testing machines were calibrated. Numerous other instruments were tested, including anemometers, tachometers, fire extinguishers, and gas meters. At the request of the Supervising Architect of the Treasury an investigation of the comparative merits of various makes of steam radiator valves has been initiated.

There is an important and increasing demand for more accurate information concerning the fundamental data needed in machine designs and for methods of determining the efficiency of mechanical

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devices. This work has been carried on in an exceedingly limited way largely in connection with requests for information on the part of other Government bureaus, but the time has come when it should constitute one of the principal sections of the Bureau's activities.

ENGINEERING, STRUCTURAL, AND MISCELLANEOUS MATERIALS.

The two testing machines of the Emery type, one having a capacity of 2,300,000 pounds and the other 230,000 pounds, are now installed and in operation. The large machine is engaged upon a series of column tests which the Bureau is making in cooperation with the column committee of the American Society of Civil Engineers, and the column committee of the American Railway Engineering Association. This series of tests on columns will take up fundamentally the question of the relation of length in terms of radius of gyration, in which different forms of cross section of component parts of members are used. At the Pittsburgh laboratory, the 10,000,000-pound Olsen machine has been engaged upon work of magnitude which has embraced column tests representing the compression members of the new Municipal Bridge across the Mississippi River at St. Louis.

At Pittsburgh there has also been established a bronze foundry, the work of which is being done in cooperation with a committee of the American Institute of Metals, the work first undertaken being that which pertains to the method of preparation and form of test pieces which shall represent castings under current engineering specifications.

The field work of the Bureau in structural materials has embraced work on the lock gates, lock walls, and emergency dams at the Panama Canal, the physical properties and behavior in place of street pavements, measurement of strains in hulls of ships at sea, continuation of the work on dead load stresses in bridges of large span; and in conjunction with the Interstate Commerce Commission, the continuance of tests on steel rails which are fractured in service and investigative tests on the behavior of the material in locomotive fire box construction.

Several hundred tests were made for various departments of the Government, covering large ropes and cables, concrete specimens from various dams, bronzes and babbitts, cast iron, iron and steel specimens, coke, electric tape, brick, tile, etc., generally to determine their efficiency and suitability for structural service. This work has been done mainly for the Isthmian Canal Commission, Navy and War Departments, United States Bureau of Mines, and the Reclamation Service. A large number of tests have been made for engineering society committees, various firms, and engineers, covering large steel columns, car couplers, concrete columns and floor slabs, street car rails, brick and concrete specimens, pipe, terra cotta, tile, copper plugs, iron and steel samples, turnbuckles, cables, etc., mainly to determine their suitability for service conditions, and also in several cases for a study of physical properties. The laboratory has been placed at the service of the Mine Cave Commission of the State of Pennsylvania and the United States Bureau of Mines to carry on an extensive series of tests covering the efficiency of various aggre-

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gates of earth, rock ashes, mine culms, etc., against settlement under great pressures, together with a number of tests of various timber cribs, grillages, props, etc., as to their availability for mine roof supports, earth retainers, etc., which tests have been conducted for several months and are still under way. An elaborate system of strain measurements were made on various sections and lengths of columns to study the effect of initial strains from riveting members, effect of length on crippling load, etc. Two studies were made on large brick piers to determine general deportment under loading to failure.

The function of the structural materials work is twofold—first, in respect to the development of accurate data upon physical properties of materials of construction, and second, upon the practical application of such data in respect to current engineering structures. The laboratory rests pertain to definition of the physical properties of materials in the abstract as the basis and foundation on which engineering constants rest. The varied conditions of service are such that it is not infrequently a matter of judgment, on the part of the engineer, what percentage of the ultimate strength can safely be made use of in structures, and the magnitude of those structures, and the relations which they bear to public safety, are factors which have to be considered. The definition and investigation of those properties which are made use of is one branch of the work of the Bureau and supplementary tests having direct reference to the use of structural materials form a part of the laboratory work; that is, there is a coordination between the laboratory and the users of materials in engineering structures which bring about a special class of testing in the laboratory in addition to the primary ones on the physical properties of material taken in the abstract. The Bureau in this way is brought into direct relationship with the structural engineers and manufacturing engineers of the country and the application of data on properties of material is made direct by the cooperation of the Bureau with the structural engineers of the country.

CEMENTS.

A total of 15,810 samples of cement were tested during the past fiscal year at the Washington, Pittsburgh, and Northampton laboratories, representing in Government purchases about 1,600,000 barrels. The work showed an increase of 15 per cent at Washington, 40 per cent at Pittsburgh, and a decrease of 25 per cent at Northampton, due to a decrease in shipments to the Canal Zone.

Samples of cement to be used in construction of Federal buildings throughout the country and miscellaneous samples received from Government departments and the public were tested at the Washington laboratory; also cements to be used in the construction of docks and inland river improvements.

There were purchased on Government contracts 226,725 barrels of cement at 14 different mills located in Virginia, West Virginia, Maryland, Pennsylvania, New Jersey, New York, and Indiana, which were inspected at the place of manufacture. The inspection included the taking of samples, testing, and subsequent inspection of packing and shipping. This method of inspection is convenient to the pur-

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chasing office in that only standard cement is received, and it may be used immediately upon delivery; it is also economical, since fewer samples can be taken, fewer tests made, and shipments can be made immediately on any Government contract from tested stock.

At the Pittsburgh laboratory most of the routine testing was done for the War Department, complete inspection being made at the place of manufacture. The cement for the Isthmian Canal was tested at Northampton. The decrease in shipments to the Canal Zone was caused by the completion of certain phases of the work.

Cement specification.—In an endeavor to obtain a United States standard specification for Portland cement the Government conference of engineers from the various departments, which was successful in formulating a Government standard specification during the preceding year, was reconvened and a joint conference organized composed of representatives from the Government conference, the American Society of Civil Engineers, and the American Society for Testing Materials. While no final agreement has been reached by the joint conference it is anticipated that a uniform specification may be agreed to during the ensuing year.

Investigations upon cement and concrete.—The experimental cement plant of the Bureau has been particularly active during the past year. In all 20 burns were made in the rotary kiln, part of these being of particular interest as bearing upon the effect of magnesia in Portland cement, which has been a much disputed question. The effect of difference of temperature of burns on the same raw material was also studied in the small "stack kiln", and very interesting results obtained. Before they can be considered conclusive they must be duplicated on a larger scale.

There has been conducted in the chemical and microscopical laboratory a great deal of work on the process of hydration of cements, particularly with the use of pure materials. A report of this work is now being prepared. The experimental cement plant has also devoted several weeks to work on clay, marl, and magnesite submitted by commercial interests.

Other investigations were continued or inaugurated during the year, such as a study of sand or silica cements, which is of considerable value to the Reclamation Service, which is now using this instead of Portland cement on some projects. The value of the soundness test and a proposed high-pressure steam test for determining the quality of the cement were investigated. Tests were also continued to determine the effects of heat, moisture, and pressure, separately and combined.

A granulometric analyzer and separator were developed in order to study the value of fine grinding of cements. An investigation was made to determine the sieving value of standard cement sieves. Work was continued on the investigation of volumetric changes which take place in concrete structures, owing to temperature variations and chemical reaction during the hardening of the concrete; this information is necessary in order to properly place expansion and contraction joints to prevent cracking of concrete structures. This work has been done almost entirely in the field, experiments being made on roadways in Michigan, Connecticut, New Jersey, Pennsylvania, and Canada.

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In order to determine the effect of alkali waters on cement as actually used in service an advisory committee was organized, composed of representatives from the Reclamation Service, the drainage division of the Department of Agriculture, the Cement Manufacturers Association, and the Bureau. This committee held several meetings and organized a program of tests which included the making of some 8,000 cement drain tile which are to be installed in eight badly alkaline districts in Colorado, Montana, Wyoming, Arizona, Washington, New Mexico, and Utah; also in Missouri and Minnesota for comparative purposes. These drainage tile are to be installed during the late summer of 1913.

An investigation was made to determine the failure of concrete in Bergen Hill Railway tunnel between Hoboken and Jersey City, N. J. This involves both laboratory and field tests which have not been completed.

Some work was done on the investigation of the permeability to water of structural materials, but it had to be temporarily discontinued.

A number of miscellaneous samples of stones, bricks, concrete, and building material were tested for various Government departments.

Steps were taken toward the organization of an advisory committee to outline a comprehensive cooperative program for a field survey and laboratory investigation of the stone resources of the United States. The committee is composed of representatives from the United States Geological Survey, the Bureau of Mines, the Office of Public Roads, and the Bureau of Standards. The work is to be done cooperatively by the various Government offices.

A publication was issued during the year (Technologic Paper No. 12) on the action of salts in alkali waters and sea water on cements.

LIME.

The lime work for the year may be grouped under three general heads: (1) A study of the properties of lime mortar, such as time of set, contraction, crushing, tensile, transverse, and shearing strengths, etc., and also of the properties of cement mortar to which different proportions of lime have been added; (2) attempted solutions of problems in which both makers and users are vitally interested, such as What happens when lime "burns" during the slaking? What is the cause of the popping or pitting of lime plaster? How can the amount of free oxide in hydrated line be estimated? (3) work in connection with committee C–7 of the American Society for Testing Materials in drawing up specifications for lime. This included the devising of tests to be applied, the testing of different limes, and the comparison of the results with those obtained by other laboratories.

A study of sand-lime brick was completed and a large number of specimens tested and the change in their properties due to weathering was determined.

CLAY PRODUCTS.

The activities of the clay products section during the past year were devoted to cooperative and testing work for various Govern-

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ment and State departments, to commercial tests of clays and clay products for the general public, and to investigative work on fundamental problems of a ceramic nature.

Cooperating with the United States Geological Survey 28 samples of clay from the State of Louisiana were thoroughly tested with a view of determining their value in the manufacture of clay products. Cooperating with the Minnesota State Geological Survey 33 samples of clay from Minnesota were tested as to their value in the manufacture of ceramic ware. About 75 tests of clays and clay products were made for the general public. Tests to the number of 35 were made on fire clay, fire brick, paving brick, and molding sands for the Isthmian Canal Commission.

An investigation to establish the limits of the losses of paving brick in the present standard rattler test was undertaken and completed. In this connection samples aggregating 5,000 bricks in number were taken from the streets of 12 cities and tested at this laboratory. The first part of an investigation to determine the value of paving brick and other products made by fusing mixtures of clay and limestone and pouring into molds of the desired shape was completed with promising results.

During the past year the work has been extended into the field of porcelain and white-ware china manufacture, with a view of encouraging in this country the manufacture of porcelain and other pottery products which are now almost exclusively imported into the United States from foreign countries. An investigation of the manufacture of high fire or true porcelain from American materials is now well under way. The manufacture of such high temperature porcelain as thermocouple tubes was studied and the first part of the work completed. The use of leadless or nonpoisonous glazes in the manufacture of American white-ware china is now being investigated. Also an investigation of the electrolytic purification of white burning American clays, with a view of promoting a wider use of domestic clays in American potteries, was undertaken and finished. An investigation as to the effect of time on the vitrification of clays was completed and will be published shortly.

RUBBER AND MISCELLANEOUS MATERIALS.

During the past year the work of the miscellaneous laboratory has been about equally divided between routine tests of miscellaneous materials for Government departments and investigations of the physical properties of rubber. Considerable progress has been made in improving methods of testing and in the development of special apparatus and testing machines.

The miscellaneous materials tested during the year included 816 samples of mechanical rubber goods, such as hose, packing, valves, belting, etc., 34 samples of leather, and 179 samples of rope, wire, metals, etc.; investigations of the life and efficiency of elastic rubber bands, of the aging properties of commercial rubber compounds, and of the properties of leather belting and methods of testing have been continued.

The following investigations have been undertaken during the past year and are now well under way:

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1. To determine the relative efficiency of different makes of hack-saw blades.

2. To determine means of identifying "squirted" or machine-made tubes, as distinguished from calendered or sheeted tubes in the case of rubber hose.

The Bureau has continued to receive assistance from manufacturers in the way of rubber compounds for testing purposes, but there is now being installed a complete rubber-mixing and vulcanizing outfit, with the aid of which it will be possible to study the behavior of rubber from the crude to the vulcanized state, and under conditions that may be controlled. This outfit will be of great value in preparing samples of definite composition and different degrees of vulcanization.

As a result of the publication of Circular No. 38, which illustrates and describes the methods used in testing rubber together with the testing machines and apparatus developed at this Bureau, numerous requests for information and assistance are being received. A number of rubber manufacturers and railroad companies are among those who have been furnished with working drawings of the testing machines.

This Bureau is in cooperation with the Navy Department, manufacturers, and technical societies in developing specifications and in perfecting testing machines and methods of testing.

Investigation of the properties of miscellaneous materials should be extended as far as possible with a view to the development of standard specifications for all Government purchasers.

PAPER.

The work in the paper laboratory for the past year includes testing 2,730 samples for the Government service and 80 samples for public and private interests. Much work has also been done on the paper-making equipment, for the purpose of making such additions and improvements as will best serve the purpose desired. A cooperative investigation relative to manufacture and use of casein for the purpose of improving present methods and finished product has been undertaken with the dairy division of the Bureau of Animal Industry, Department of Agriculture. This investigation will have for its special purpose the study of, and improvements in, the utilization of casein for coating and sizing paper.

Cooperation work has been started between this laboratory and all other commercial and Government laboratories now doing paper testing, for the purpose of standardizing methods and to bring about a better understanding for the good of all concerned.

Aside from a general study of improvements in methods of testing paper for Government service, this laboratory has also undertaken work which has for its primary object the securing of information of direct value to the paper industry. The conference between paper manufacturers, commercial testing laboratories, and Government testing laboratory held at this Bureau was of noteworthy interest and did much to establish a better understanding between the manufacturing and Government service. It is proposed to have such a conference each year.

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A special investigation has been undertaken, the results of which will be immediately beneficial to lithographers, process printers, and Government map printing. Studies are being made as to cause of and remedies for paper deterioration. A circular relating to paper is being prepared to assist users of paper to more correctly judge a paper for a particular use; this applies more particularly to the smaller users of paper.

Cooperative work has been begun between this laboratory and other laboratories in Government service now doing work relative to the paper industry. This work will save duplication and enable each laboratory to carry on work best suited to its equipment and experience. Cooperative work has also been taken up with the Treasury Department, relative to a more distinctive paper for United States currency.

TEXTILES.

The analysis of imported bagging for cotton for the customs service was an important test. During the year in all 150 individual samples were analyzed. Government departments were advised as to the quality of the goods being delivered upon contract specifications, and as many of the deliveries did not meet the specified requirements a number were rejected upon the results of tests. The textile laboratory rendered valuable assistance to the general supply committee in the drafting of specifications for fabric, carpets, thread, twine, and rope, and the testing of these materials when making awards for the coming fiscal year.

On December 16, 1912, a conference of textile representatives of the various Government departments met at this Bureau. The topics of discussion were the drafting of textile specifications, testing of deliveries, uniformity in methods of testing, and closer cooperation between departments and the Bureau. Five different departments were represented, seven of the delegates being purchasing agents. This conference accomplished much good and was effective in bringing about closer cooperation with the Bureau.

At the request of the National Association of Cotton Manufacturers a paper was prepared, "Humidity effects upon textile material," for their annual convention. During the year Circular No. 41, "Testing and properties of textile material," and Technologic Paper No. 19, "Physical testing of cotton yarns," were prepared. In addition to these there were five technical articles written upon textile topics.

The following investigations were undertaken, and most of them were completed during the year: The number, tensile strength, yards per pound and per spool of the more common brands of spool thread used by garment manufacturers and in the household; methods of ascertaining the wool content of a wool and cotton fabric; the extraction of sizing and loading material in cotton goods; stripping of the dye or color in fabrics, etc.; the "regain" of moisture of cotton yarn and fabric of various common commercial makes; short correct methods for determining the yarn number of yarns, upon cops, bobbins, spools, etc., and the rapid determination of the finest yarns present in a fabric; the "shrinkage" in scouring some excep-

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tionally heavy foreign wool fleeces and the percentage moisture and "regain" of raw wool, also the clean (scoured) wool under standard atmospheric conditions; the difference in number, strength, and weight of commercially identical worsted yarns manufactured by different concerns and sold on the market at the same price; the moisture present and the "regain" of moisture of worsted tops, under standard atmospheric conditions; the influence of humidity upon worsted yarns.

It has been only a short time since definite specifications have been employed and these are used to a limited extent by the more progressive concerns. Close cooperation exists between the textile section of this Bureau and the Bureau of Plant Industry, Department of Agriculture, and at the present time the Bureau is helping them in their studies of methods of improving the grades of cotton and the marketing of same.

The Government departments have requested the Bureau to assist in drafting specifications for textiles and to test goods delivered upon contracts.

THE OFFICE.

LIBRARY.

The number of accessioned volumes in the Bureau library is now 10,414; 326 periodicals, 215 of which are by exchange and 111 by subscription, are currently received here and at Pittsburgh. The extra copies of copyrighted books relating to the Bureau's work have been transferred from the Library of Congress to the Bureau, as in previous years.

PUBLICATIONS.

The following new Circulars were issued during the year: "Electric wire and cable terminology," "The physical testing of mechanical rubber goods," "Specifications for and measurement of standard sieves," "Sodium oxalate as a standard in volumetric analysis," and "Testing and properties of textile materials."

The following Scientific Papers were issued: "A new precision calorimeter," "Instruments and methods used in radiometry," "Antenna resistance," "Energy losses in some condensers used in high-frequency circuits," "Selective radiation from various substances," "On a modified form of stability test for smokeless powder and similar materials," "Atomic weight of bromine," "The silver voltameter—Part I, first series of quantitative experiments," "The silver voltameter—Part II, the chemistry of the filter-paper voltameter and the explanation of striations," "The diffuse reflecting power of various substances," "Density and thermal expansion of ethyl alcohol and of its mixtures with water," "A micropyrometer," and "A simplified formula for the change in order of interference due to changes in temperature and pressure of air." Five numbers of the Bulletin were issued.

The following Technologic Papers were issued: "Comparison of five methods used to measure hardness," "Action of the salts in alkali water and sea water on cements," "The evaporation test for mineral

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lubricating and transformer oils," "Legal specifications for illuminating gas," "The manufacture of lime," "The function of time in the vitrification of clays," "Physical testing of cotton yarns," "Determination of sulphur in illuminating gas," "The dehydration of clays," "The technical control of the colloidal matter of clays," "The determination of phosphorus in steels containing vanadium," and "The effect of overfiring upon the structure of clays."

PERSONNEL.

During the fiscal year 1913 the personnel consisted of 193 persons employed in statutory positions and about 88 upon special research and investigation specially authorized by Congress. The statutory positions were classified as follows:

Scientific.—One chief physicist, 1 chief chemist, 2 associate chemists, 3 physicists, 12 associate physicists, 32 assistant physicists, 7 assistant chemists, 38 laboratory assistants, 15 aids, 12 laboratory apprentices, and 3 laboratory helpers; total, 126.

Office.—Secretary, 1 storekeeper, 1 librarian, 14 clerks, 1 packer and shipper, 5 messenger boys; total, 23.

Operation of plant.—Superintendent of mechanical plant, 4 assistant engineers, 2 electricians, 3 firemen, 3 watchmen, 1 messenger, 5 skilled laborers, 4 laborers, 3 janitors, 2 female laborers, 1 telephone operator, 1 elevator boy; total, 30.

Construction.—One chief mechanician, 8 mechanicians, 2 skilled woodworkers, 1 draftsman, 1 glass blower; total, 13.

SUMMARY OF TESTS.

The work of the Bureau involves, among other things, a large amount of testing of standards, measuring instruments, and materials. A certain amount of this work is already organized on an accurate routine basis and is handled with dispatch, through increased efficiency of appliances and methods of testing. Much of it, however, involves investigation of the scientific principles underlying the test, a study of existing methods, and the development of new standard tests of known accuracy. In such cases the research which must precede the actual testing is a most important function of the Bureau. For the test a reasonable fee is charged, except when made for the National or State Governments. The corresponding amounts for Government testing are of interest, however, and are added to the statement of tests which follows:

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NUMBER AND VALUE OF TESTS COMPLETED, FISCAL YEAR ENDED JUNE 30, 1913.

Nature of test.	For Government.		For public.		Total.	
	Number.	Value.	Number.	Value.	Number.	Value.
Length	219	$1,051.25	481	$691.75	700	$1,743.00
Mass	1,719	1,365.00	729	382.80	2,448	1,747.80
Capacity	4,404	1,650.00	1,322	784.45	5,726	2,434.45
Temperature	2,594	1,209.16	10,952	3,373.23	13,546	4,582.39
Hydrometry	1,976	2,019.25	152	238.60	2,128	2,257.85
Miscellaneous	11	65.00	4	57.00	15	122.00
Optical	1,538	1,382.00	393	214.75	1,931	1,596.75
Electrical	378	798.75	396	1,740.90	774	2,539.65
Photometry [a]	4,950	15,127.00	310	1,105.50	5,260	16,232.50
Chemical [b]	8,353	55,077.15	1,667	3,251.00	10,020	58,328.15
Physical and mechanical tests:						
Engineering (miscellaneous)	819	2,152.00	6	10.00	825	2,162.00
Engineering (instruments)	206	1,081.00	31	150.50	237	1,231.50
Structural materials	15,936	25,208.20	255	1,296.00	16,191	26,504.20
Paper and textiles	3,444	7,096.33	120	181.00	3,564	7,277.33
Total	46,547	115,282.09	16,818	13,477.48	63,365	128,759.57

[a] In addition, the Bureau inspected 1,283,289 incandescent lamps at various factories for other departments of the Government, the fees for which would amount to $11,682.69.
[b] 3,834 of these tests, amounting to $33,913.75, were chemical tests made on structural materials.

The receipts for tests were as follows:

Total receipts, 1913		$13,439.48
Received prior to July 1, 1912, for tests completed in fiscal year 1913	$643.75	
Outstanding fees	55.65	
Refunds	20.17	
		719.57
		14,159.05
Received for tests completed, fiscal year 1912	28.00	
Received for tests in progress at close of fiscal year 1913	653.57	
		681.57
Fees for tests completed, fiscal year 1913		13,477.48

FINANCIAL STATEMENT.

The following statement shows the amount and object of each appropriation provided for the Bureau for the fiscal year 1913, the disbursement during the year, the amount of unfilled and unpaid orders at the close of the year, and the unexpended balance remaining at the close of business June 30, 1913:

Appropriation.	Total appropriation.	Disbursement.	Liability.	Balance.
Salaries	$241,312.66	$216,974.96	$9,724.66	$14,613.04
Equipment	52,000.00	29,011.21	22,859.30	129.49
General expenses	25,000.00	19,435.86	5,413.86	150.28
Grounds	3,000.00	2,585.72	409.91	4.37
Testing structural materials	77,342.50	70,277.27	6,962.71	102.52
Testing machines	30,000.00	25,700.82	4,277.78	21.40
Investigating effects of electric currents	10,000.00	9,095.18	813.65	91.17
Refrigeration constants	15,000.00	9,580.23	5,415.13	4.64
Water current meter testing tank	5,000.00	1,270.00	3,005.80	724.20
Equipment, electrical laboratory	25,000.00	2,160.73	20,552.97	2,286.30
Additional land	85,000.00	68,034.00	.....	16,966.00
Testing machine (Emery)	180,000.00	179,866.23	.....	133.77
Testing structural materials of the United States	23,350.00	23,350.00	.....	.....
Testing machine at Pittsburgh	25,000.00	24,974.95	.....	25.05
Laboratory	200,000.00	171,444.76	24,195.02	4,360.22
Total	997,005.16	853,761.92	103,630.79	39,612.45

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The following statement shows the condition of the appropriations for the two preceding fiscal years at the close of business June 30, 1913:

Appropriation.	1911				1912			
	Total appropriation.	Disbursement.	Liability.	Balance.	Total appropriation.	Disbursement.	Liability.	Balance.
Salaries	$201,440.00	$189,552.27	.....	$11,887.73	$236,340.00	$224,050.96	.....	$12,289.04
Equipment	46,000.00	45,910.60	$25.34	64.06	52,027.50	50,570.33	$1,198.50	258.67
General expenses	20,042.37	19,960.61	.20	81.56	25,702.77	25,248.74	215.04	238.99
Grounds	3,000.00	2,785.57	.....	214.43	3,000.00	2,892.93	.....	107.07
Testing structural materials	55,109.10	54,917.81	.....	191.29	78,533.50	77,987.37	315.52	230.61
Investigating effects of electric currents	15,000.00	14,859.58	38.92	101.50	15,000.00	14,807.11	69.65	123.24
Weights and measures	10,000.00	9,081.89	.....	918.11	.....	.....	.....	.....
Testing machines	.....	.....	.....	.....	30,000.00	29,793.92	.....	206.08
Total	350,591.47	337,068.33	64.46	13,458.68	440,603.77	425,351.36	1,798.71	13,453.70

Respectfully,

S. W. STRATTON, *Director.*

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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REPORT

OF THE

DIRECTOR OF THE CENSUS

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REPORT

OF THE

DIRECTOR OF THE CENSUS.

DEPARTMENT OF COMMERCE,
BUREAU OF THE CENSUS,
Washington, November 26, 1913.

SIR: There is submitted herewith the following report upon the operations of the Bureau of the Census during the fiscal year ended June 30, 1913, and upon the work now in progress. As I did not take the oath of office until July 1, 1913, the work of this Bureau during the entire fiscal year 1913 was under the charge of my predecessor, Director E. Dana Durand.

A very considerable part of the Bureau's force was engaged during the fiscal year upon the deferred work of the Thirteenth Decennial Census, but the usual annual investigations regarding financial statistics of cities, production and consumption of cotton, vital statistics, and forest products were carried on, and in addition work was done on the tobacco inquiry (authorized by act of Congress approved Apr. 30, 1912) and the quinquennial census of electrical industries.

PROGRESS OF DEFERRED THIRTEENTH CENSUS WORK.

POPULATION.

The Division of Population was engaged during the fiscal year ended June 30, 1913, wholly on work in connection with the Thirteenth Census. This work comprised, first, the preparation and, in large part, the completion of the text and tables for the general and State reports on population (Vols. I, II, and III of the Thirteenth Census reports), and second, the practical completion of the machine tabulation and other work preceding the actual preparation of the tables for the occupation report (Vol. IV).

Publications issued.—The State bulletins giving the composition and characteristics of the population had been issued at the close of June, 1912, for Alabama and Indiana and were issued for the remaining States of continental United States by the end of June, 1913.

These State bulletins, together with the series giving for each State the population by minor civil divisions, were bound up together to form Volumes II and III of the Thirteenth Census reports. Volume II, covering in alphabetical order the States from Alabama to Montana, inclusive, was released for printing in May, 1913, and

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issued in August, 1913. Volume III, covering the States from Nebraska to Wyoming, together with Alaska, Hawaii, and Porto Rico, was in process of verification at the close of June, 1913, but was not released for printing until the following August, and was issued in September.

The following-named Abstract bulletins—that is, bulletins reprinted from the Abstract—were also issued during the fiscal year:

State of Birth of Native Population.
Age and Marital Condition.
Country of Origin and Date of Immigration.
Color or Race, Nativity, Parentage, and Sex.
School Attendance and Illiteracy.

The following branches of work were deferred in February, 1912, after the discontinuance of the temporary Thirteenth Census force, in order that the general and State reports on population might be completed as soon as possible: Occupations; ownership of homes; Indian population; foreign stock; and birthplace of mother, for vital-statistics purposes. The occupation work and the tabulation of ownership of homes are the only branches of the deferred work which have since been resumed (in September, 1912, and April, 1913, respectively), although a bulletin, Statistics of the Indian Population, based on the material already prepared for the first section of the Indian report, was compiled and issued on June 26, 1913.

The preparation of the tables and text for the general report on population, covering a total of 16 chapters, was not actively begun until December, 1912, and the first copy, covering three chapters, was sent to the printer in March, 1913; but by the close of June, 1913, copy was in the hands of the printer for 12 chapters, and for 10 of them proofs, in whole or in part, had been received.

The work of preparing the tables for the general and State reports, as originally outlined, included the computation (in duplicate) of very nearly 500,000 percentages, but in the revision of the tables this number was reduced to a little more than 400,000. These percentages were largely computed on slide-rule machines, an average of five machines being in operation during the fiscal year. At the close of June, 1912, the percentage work for the general tables had been completed for 21 States and partially completed for 10 other States. It was substantially completed for all the general and text tables for the Abstract in December, 1912, and for the general and State reports in June, 1913.

The tables and text for the entire 16 chapters are now (Nov. 26, 1913) in proof. The material for 15 chapters is substantially ready to be released for printing, and it is expected that the material for the remaining one will be ready early in December. This will complete the publication of the Thirteenth Census reports on population.

OCCUPATIONS.

The work on occupations was begun in May, 1911, but was suspended in the following January, owing to the large reduction in the temporary force. It was resumed on September 4, 1912, when temporary clerks were again employed. The revision and correction work with respect to this subject had been completed at the close of June, 1913, for 13 States, but the necessity of providing for the com-

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pletion of the general report on population and the requirements of the occupation work in other directions made it impossible to give much attention to the results of the occupation count in these States up to that time, but this work was actively taken in hand in September, 1913, and it is expected to complete and publish the report on occupations by the end of the present calendar year.

INSTITUTIONAL POPULATION.

The tabulation of statistics of the institutional population—that is, insane, feeble-minded, paupers, and prisoners and juvenile delinquents—was practically suspended early in the calendar year 1912 because of the great reduction made necessary in the temporary force of the Bureau, and was not resumed until September 4 of that year, when the temporary clerks, reappointed under authority of the appropriation act for 1913, became available. During the remainder of the fiscal year this work was carried on, and by June 30, 1913, the statistics of insane and feeble-minded in institutions had been tabulated and those for paupers in almshouses had been partly tabulated, while a part of the preliminary work (editing and card punching) had been done on the schedules for prisoners and juvenile delinquents.[a]

BLIND AND DEAF.

In the regular population census the enumerators were instructed to make a return for all persons who were either blind or deaf and dumb. Special schedules for obtaining information relative to these classes were then mailed to the appropriate names and addresses given on the regular population schedules. Most of these special schedules which have been returned were in possession of the Bureau before the beginning of the fiscal year 1912–13. During that year, however, owing to the pressure of other work, very little was done on this inquiry beyond examining and filing such schedules as continued to come in, and preparing lists of the blind or deaf and dumb for the use of institutions for these classes.

BENEVOLENT INSTITUTIONS.

During the fiscal year the principal tabulations relative to benevolent institutions were completed, and considerable work was done on the preparation of derivative or text tables.[b]

MANUFACTURES.

State bulletins (Vol. IX, Thirteenth Census reports).—State bulletins giving the principal statistics of manufactures were issued for all States except Illinois, Ohio, and Pennsylvania prior to July 1, 1912. The bulletins for these three States were printed during the fiscal year, and the entire series was assembled and bound together in one volume, constituting Volume IX of the Thirteenth Census reports.

General report on manufactures (Vol. VIII, Thirteenth Census reports).—Practically all of the copy for this volume was sent to the

[a] For present status and plans for future work on this subject, see p. 231.
[b] For present status and plans for future work on this subject, see p. 232.

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printer before the close of the fiscal year; it was printed and distributed during September, 1913. This report assembles the statistics for each industry, gives a detailed description of the scope of each classification, and analyzes the statistics of manufactures for all industries. The data for each industry are summarized by States. Separate chapters are presented discussing manufactures in cities, localization of manufacturing industries, character of ownership, size of establishments, expenses, persons employed in manufacturing industries, power used, and fuel consumed.

Bulletins on selected industries (Vol. X, Thirteenth Census reports).—Copy for some of the separate bulletins on the principal industries was sent the printer during the fiscal year, and a large number of these bulletins were printed and distributed. In addition to the general statistics concerning capital, employees, wages, and expenses most of these bulletins contain detailed statistics in regard to the quantity and cost of the principal materials used and the quantity and value of the different classes of products, and in some cases in regard to the equipment employed. These bulletins will be assembled and printed as Volume X of the final reports. This volume will be ready for distribution before the close of the calendar year.

MINES AND QUARRIES.

A bulletin giving the statistics for the mining and quarrying industries for the United States and for each State, and also giving separate totals for each mining industry, was printed during the fiscal year. The bulletin giving detailed statistics for the production of anthracite and bituminous coal was also printed and distributed. Copy for the bulletin on iron mines was sent to the printer before the close of the fiscal year, and the bulletin was issued in the following September.[a]

AGRICULTURE.

Abstract bulletins.—A series of Abstract bulletins was issued, each pertaining to a given branch of agriculture and including data for the United States as a whole and for divisions and States. Some of these were published prior to July 1, 1912; others were issued during the last fiscal year. All were later included as chapters in the Abstract of the Thirteenth Census.

State bulletins—Agriculture.—A preliminary series of State bulletins was issued prior to July 1, 1912. A second series of State bulletins, giving the complete statistics for each State and for each of the outlying possessions—Alaska, Hawaii, and Porto Rico—was issued between July 1, 1912, and June 30, 1913. The last of the bulletins issued for continental United States were those for Texas and West Virginia, which appeared in February. The bulletin for Hawaii was issued in March and that for Porto Rico in April, these being the last of the series.

Irrigation bulletins.—Only one series of bulletins pertaining to irrigation was issued. These bulletins were for the various Western and Southern States where irrigation is practised to a considerable

[a] For present status and plans for future work on this subject, see p. 231.

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extent. Some of the bulletins of this series were issued prior to July 1, 1912, and the remainder during the last fiscal year.

Thirteenth Census reports, Volumes VI and VII.—The series of State bulletins pertaining to agriculture and irrigation were also assembled, arranged, consolidated, and bound during the last fiscal year, appearing as Volumes VI and VII of the Thirteenth Census reports.

Thirteenth Census reports, Volume V.—The agricultural statistics obtained at the Thirteenth Census are contained in Volumes V, VI, and VII of the Thirteenth Census reports. The preparation of Volume V, referred to as "General report and analysis," was undertaken and completed during the last fiscal year, all the copy having been sent to the printer by June 30, 1913. On account of the inclusion of a very comprehensive series of maps and charts, and by reason of the necessity for thorough verification of data, the volume did not come from the press until November 21. This completes the Thirteenth Census reports on agriculture.

ABSTRACT OF THE THIRTEENTH CENSUS.

The Abstract of the Thirteenth Census was published in December, 1912. This volume presents the principal statistics gathered at the census of 1910, covering the subjects of population (with the exception of occupation data), agriculture, manufactures, and mining. It contains a condensed but comprehensive text analysis of the data; many diagrams and maps; and many tables which include, for comparison, the statistics of prior censuses and give innumerable averages and percentages without which it would be difficult or impossible to grasp the significance of the data presented. It also includes a supplement giving complete and detailed statistics for some one State.

The abstracts of former censuses contained no State supplement, no text, no diagrams or maps, and very few averages, percentages, or comparative statistics. Any person possessing a copy of the Abstract of the Thirteenth Census will find in it the main results of that census for the United States, for the individual States, and for all principal cities. He will have, furthermore, the statistics for the counties and minor civil divisions of the State of which he is a resident—assuming that he has selected the edition for that State. He will find in it, for the county in which he lives, and of course for any other county in the State, such facts as the population at each census from 1870 to 1910, inclusive; the number of whites, negroes, foreign-born whites, native whites of native parentage, and native whites of foreign or mixed parentage; a classification of the foreign white element according to country of origin; the number of males of voting age classified by color and nativity; the number and percentage of illiterates; the number and percentage of children attending school; and the number of dwellings and families. He will also find the number of farms, classified according to size; the farm acreage and the value of farm property, distinguishing land, buildings, implements and machinery, and domestic animals; the number and value of cattle, horses, swine, sheep, and other domestic animals kept on farms; the number of farms operated by owners, by tenants, and by managers,

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respectively; the mortgage debt of farms; the acreage and value of the principal farm crops; the quantity and value of the principal classes of live-stock products, etc. For each of the principal cities in the State the supplement presents population details similar to those given for counties, and also statistics for manufacturing industries giving number of wage earners, horsepower, expenditures for wages, cost of materials, value of products, etc.

The Abstract was prepared with the idea of making it possible to supply, in one volume, complete and detailed information regarding all States and principal cities of the United States. Therefore this volume furnishes all the census information which ninety-nine persons in a hundred desire to have, and thus to a great extent takes the place of the large volumes issued at previous censuses. With the belief that this was, for the general public, the most important volume to be issued in connection with the Thirteenth Census, it was given precedence and the right of way over the main reports, and consequently, instead of being one of the last volumes to appear, as has been the case at most censuses, it was the first.

WORK OF THE PERMANENT CENSUS BUREAU.

VITAL STATISTICS.

Annual Report, 1909.—The annual report on mortality statistics for 1909 was published in September, 1912. The delay in the publication of this report was due chiefly to two causes—(1) interference of the Thirteenth Census work with the annual work of the Bureau; and (2) the revision of the mortality rates for the 10 years of the intercensal period on the basis of the population statistics available from the census of 1910. The report for 1909 is more than a mere annual report, and constitutes a permanent volume for reference concerning rates for each of the years 1900–1909.

Annual Report, 1910.—Work on the annual report for 1910 was also delayed by the Thirteenth Census work. This report was published in October, 1913.

Annual Report, 1911.—The compilation of the annual report for 1911 was under way on July 1, 1912, and was carried on during the fiscal year. It will be published in December, 1913, as will the annual report for 1912. Bulletin 112, Mortality Statistics, 1911, containing some of the more important data and text, with standardized and specific death rates, was issued in May, 1913.

Registration area.—The extension of the registration area is a very important part of the vital-statistics work of the Census Bureau, and it is very gratifying to be able to state that satisfactory laws, based on the model bill recommended by the Census Bureau, or laws which, with slight revision, should give good results, have been adopted in Arkansas, North Carolina, and Tennessee during the year just closed and are soon to go into effect.

The model registration law recommended by the Bureau of the Census was adopted and put into practical operation in Mississippi and Virginia in 1912, and is giving excellent results, although the difficulties of registration are very great, especially in Mississippi, in which State the law has been in force for less than a year. The results in Virginia, although registration is evidently defective in

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certain parts of the State, were on the whole sufficiently good to warrant the admission of that State to the registration area for deaths in the year 1913.

New York, one of the registration States, has also recently adopted the model law as a substitute for the legislation formerly in force. Louisiana is preparing to enforce the registration of vital statistics under regulations adopted by the State Board of Health, based on the model law. Earnest efforts have been made during the past year in Georgia, Illinois, Iowa, and other States to secure adequate legislation.

The progress of this movement is, on the whole, satisfactory, although it is unfortunately true that the enforcement of registration laws does not advance as rapidly as their enactment.[a]

STATISTICS OF CITIES.

Annual Reports, 1909, 1910, 1911, and 1912.—The field and most of the office work on the reports on general statistics of cities and on financial statistics of cities for 1909 and on the report on financial statistics of cities for 1910 had been finished before June 30, 1912. Owing to the pressure of the Thirteenth Census work, however, and to the probability that the Bureau's appropriations for printing would be insufficient to permit the prompt publication of these reports without delaying those of the Thirteenth Census, the final work on them was suspended for a time. In order not to delay the Thirteenth Census work, the field work for the report on financial statistics of cities for 1911, which would ordinarily have been begun early in 1912, was postponed until September of that year. This work was completed in April, 1913, and during the same month the field work was begun on the 1912 report.

The office work on the reports on financial statistics of cities for 1909 and 1910 was completed early in the fiscal year 1913, and these two reports were issued during that year, the former in February and the latter in April. At the close of the fiscal year the office was engaged in completing the tabulation and preparing the text for the 1911 report. The revised page proof for this report was returned to the printer for plating about November 1.

The field work for the 1912 report had been completed for 42 cities by June 30, 1913, and was making commendable progress elsewhere, considering the smallness of the force available for this work.[b]

The report on general statistics of cities for 1909 was in page proof on June 30, 1913, and was issued soon thereafter. It had been the custom of the Bureau up to 1909 to issue this report biennially. By reason, however, of the necessity for concentrating the force of the office so far as possible on Thirteenth Census work, no data for a report on general statistics of cities were collected for 1911.

ELECTRICAL INDUSTRIES.

The preliminary work on this inquiry was begun in the latter part of the calendar year 1912. The field work was started in the spring of

[a] For present status of vital-statistics work, see pp. 232 and 235.
[b] For the present status of the work on Financial Statistics of Cities, see p. 232.

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1913, and was finished in the following October. The examination of the returns is now (Nov. 26) in progress, and the tabulation has been begun. It is expected that the preliminary report will be ready for publication some time in February, 1914, and that the final report will be ready for the printer early in the following spring.

MECHANICAL LABORATORY.

Operations in the mechanical laboratory during the past year comprised the completion of seven automatic and four semiautomatic tabulating machines to such an extent that they may be used upon work requiring not more than 33 per cent of their total capacity in counters; maintenance and repairs of machines of the old type, for use on vital-statistics work; maintenance of sorting machines engaged upon the sort for statistics of occupations, representing the handling of 156,000,000 cards; maintenance of the Bureau of Immigration tabulating equipment; and repairs to adding and computing machines and machines in general.

The remaining counters and parts necessary to a full equipment for the above-mentioned tabulating machines were 60 per cent complete at the end of the fiscal year. Construction of three of the original number of machines of the semiautomatic type was about 30 per cent complete.

The results attained by the aid of devices and accessories originated and placed upon a practical working basis by the mechanical laboratory during the past two years stand as ocular proofs of consistent progress. The increase in speed and efficiency of the tabulating work of the Bureau, together with the added economy resulting from the work of the mechanical laboratory, entitles this branch of the Bureau's work to the fullest consideration.

ESTIMATES OF POPULATION.

The work of preparing estimates of the present population of the United States, of the various States and counties, and of cities of 8,000 or more population in 1910 was carried on as usual. These estimates are used in the annual reports on mortality statistics and on statistics of cities, and are furnished to health officers and other State, county, and municipal officials. Estimates of the population of a specified list of townships, cities, and villages as of November 24, 1913, have been made for the State Liquor Licensing Board of Ohio, in accordance with the provisions of the liquor licensing law of that State.

The preparation of estimates of population of cities involves considerable correspondence with city officials each year in order to ascertain the changes in area which have been made during the year. These estimates are based upon the population at the last census, the rate of growth during the period between the last two censuses, and the changes in area, if any, which have been made.

FOREST PRODUCTS.

The annual collection of statistics of forest products was made.[a]

[a] For discussion of the origin and present status of this inquiry, see p. 232.

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COTTON STATISTICS.

In July, 1912, Congress passed an act providing that statistics of the consumption, stocks, exports, and imports of cotton and of the number of cotton-consuming spindles should be collected by the Bureau of the Census monthly, instead of quarterly, as had been the practice, and making certain minor changes in the method of publishing the statistics of cotton production. The purpose of this legislation was to furnish producers with information concerning demand as frequently as consumers are furnished with statistics concerning supply. The first report made under the authority of this act was issued in August, 1912.

There were published during the year the usual reports, 10 in number, showing the amounts of cotton ginned to specified dates during the ginning season.

In January, 1913, there was issued a mid-season report showing the amount of cottonseed crushed and linters obtained during the ginning season up to December 31. Theretofore such data had been published annually at the end of the cotton season.[a]

TOBACCO STATISTICS.

In April, 1912, Congress passed an act providing for the collection, as of April 1 and October 1 of each year, of statistics regarding the stocks of leaf tobacco held by manufacturers and dealers. The first report under this act was made on November 27, 1912, and was received with much interest by those engaged in the tobacco trade. The second report, relating to April 1, 1913, was made on May 26 of that year. The third report, relating to October 1, 1913, was issued on November 13 of the present year.[b]

INCREASE OF WORK IMPOSED BY RECENT LEGISLATION.

The two acts of Congress just referred to have materially increased the work of the Census Bureau. The appropriations for carrying on this additional work have been much less than were requested, but the Bureau has endeavored to make the best use possible of the funds provided.

WORK FOR THE FISCAL YEAR 1914.

In view of the delay in the publication of the results of the Thirteenth Census, the Director, early in the fiscal year 1914, appointed a committee consisting of the Chief Statistician for Manufactures, the Chief Clerk, and the Expert Special Agent in charge of the Division of Agriculture, to investigate the work in all the divisions of the Bureau and to make recommendations which would lead gradually to a complete reorganization. This committee accumulated a large quantity of material and made a number of recommendations which resulted in great improvement in certain branches of the Bureau's work.

It has also been the earnest desire of the Director to bring the work up to date, and to this end he deemed it desirable to have the assistance and advice of persons who were outside of the Census Bureau

[a] For present status and plans for future work on this subject, see p. 233.
[b] For present status and plans for future work on this subject, see p. 234.

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but who were familiar with its work. He accordingly selected for this purpose Hon. S. N. D. North and Hon. W. R. Merriam, former Directors of the Census; Prof. Walter F. Willcox, of Cornell University, who had been a chief statistician in the Bureau during the census of 1900, and who for the greater part of the time since has been connected in some capacity with the work of the office; Mr. W. S. Rossiter, who had been a chief of division and later Chief Clerk of the Bureau; and Hon. Daniel C. Roper, First Assistant Postmaster General, who had been an expert special agent and chief of division in the Census Bureau. These gentlemen, with the exception of Mr. Roper, were given appointments as expert special agents. After examining the material and recommendations made by the committee of the regular employees of the office, they conducted an independent investigation of conditions in the Bureau, conferring with the chief statisticians and other officials in charge of the different branches of the work. They found that, while the larger proportion of the work of the Thirteenth Census had been finished and published, nevertheless a considerable quantity of statistical information collected at that census still remained to be tabulated and published. The most serious delay was in the work on statistics of occupations. This, however, as already stated, had been deferred, along with certain other branches of the work, in order to permit the publication of the balance of the reports at the earliest possible date. The work on some of the annual reports of the Bureau—in particular, Financial Statistics of Cities, 1912, and Mortality Statistics, 1911 and 1912—was also far in arrears.

The expert special agents advised the Director that no additional tabulations or analyses should be undertaken in connection with the unfinished branches of the Thirteenth Census work, and that the work on those branches and on the delayed annual reports could and should be curtailed so as to insure their publication not later than December 31, 1913.

The recommendations of the expert special agents were as follows:

1. That the proposed second machine run of the cards for the purpose of tabulating occupations be abandoned, thus expediting the time of production by about six months and reducing the cost of finishing that branch by about $65,000; and that the tables yielded by the first run of the cards be printed without derivative tables or text. These tables give the number of persons of each sex in each occupation, and classify them by race, nativity, and parent nativity, and five age periods, thus insuring the publication of the primary classification of occupational data as reported at previous censuses.

2. That the report upon native tongues be limited to the chapter to appear in the forthcoming final volume on population.

3. That the tables relating to mines and quarries now in the form of printed bulletins, proofs, or manuscript be sent to the Public Printer at once, the same to constitute the final report on mines and quarries, and that no further tabulation or text be prepared in connection with that report.

4. That tables for the benevolent institutions, and for the institutional population—namely, prisoners, insane and feeble-minded, and paupers—be prepared and published without further percentage or other derivative tables and without analytical text.

5. That the annual compilation of the statistics of forest products be abandoned. There appears to be no authoriay of law for an annual inquiry of this character, which the records show to have cost from $20,000 to $40,000 a year.

6. That the annual report on financial statistics of cities for 1912 be completed and published by January 1, 1914, by curtailing the amount of detail to be included; that the schedules and report for 1913 be similarly curtailed; that the reports for the years 1912 and 1913 be printed without text, except such

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as is necessary for explanation and definition, and that until the annual reports on the financial statistics of cities are brought up to date no attempt be made to prepare a report on general municipal statistics. This recommendation is based on the fact that delay in the compilation and publication of the annual municipal reports detracts seriously from their value.

7. That reports on mortality statistics for the years 1911 and 1912 be published before the close of the present calendar year. To make this possible, the text of these reports should be reduced to a minimum or omitted, the tables condensed, and no effort made to publish a report on births until the mortality reports are published.

8. That work upon the standardization of death rates, life tables, and occupational mortality be suspended until the above reports have been published. There is no reason why the mortality report for each year should not be compiled and published prior to the close of the succeeding calendar year.

9. That the emergency presented by the delay in completing the Thirteenth Census justifies the Director in requesting the Secretary of Commerce to lay the matter before the President, with the view of securing his instructions to the Public Printer to give precedence so far as practicable to the remaining publications of the Thirteenth Census and the annual reports long overdue.

OCCUPATIONS.

In accordance with recommendation 1, the report on occupations will be based upon the results of the first machine count of the cards. It is expected that all the copy will be in the hands of the printer before the close of the calendar year.

NATIVE TONGUES.

Recommendation 2 is being carried out.

MINES AND QUARRIES.

In accordance with recommendation 3, no further tabulation or text is being prepared in connection with the report on mines and quarries. The work on this branch of the Thirteenth Census work was very much in arrears, and it became evident that in order to print the report within any reasonable time it would be necessary to abandon some of the bulletins and monographs which had been contemplated. The copy for the final report, which will be Volume XI of the reports of the Thirteenth Census, is now in the hands of the printer, and the proof is being compared as rapidly as possible.

INSTITUTIONAL POPULATION.

In order to carry out recommendation 4, the work on the census of institutional population was restricted to the publication of the general tables, without percentages and without interpretative text. After the expert special agents had made their recommendations, however, it was found necessary to make a further very material curtailment of the work on the census of prisoners and juvenile delinquents, in order to limit it to tabulations which could be completed before January 1, 1914. The work authorized now includes only the completion of the tables giving the number present in each prison, jail, or reformatory on January 1, 1910, classified by sex, color, and nativity, and by offense and sentence, together with the number committed and discharged during the year, classified only by sex, color, and nativity.

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BENEVOLENT INSTITUTIONS.

The report on benevolent institutions will be published by the close of the year in accordance with the original plan, without any substantial curtailment.

FOREST PRODUCTS.

In accordance with recommendation 5, no further compilation of statistics of forest products will be undertaken in the absence of legislation authorizing it.

The first collection of annual statistics concerning the production of lumber, lath, shingles, cooperage stock, and other forest products was made for the year 1906, in compliance with authority contained in a letter dated September 18, 1906, from the Assistant Secretary of Commerce and Labor to the Director of the Census. A letter dated September 26, 1907, from the Secretary of Commerce and Labor authorized the Director to collect these statistics for the year 1907. There appears to have been no further authorization for the annual collection of such statistics. The work, however, has been continued annually and reports have been issued for every year up to and including 1911. The report for 1912 is now being prepared. It is evident from the correspondence and records that it was not the original intention to establish a permanent annual investigation of this character. All other inquiries undertaken by the Bureau of the Census are based upon acts or resolutions of Congress, and in the absence of such specific legislation with reference to forest products the Director and the expert special agents concluded that the Bureau was not justified in continuing this annual investigation. The Director, accordingly, ordered that it be discontinued after the issuance of the report for 1912.

A number of lumber manufacturers and associations of manufacturers have protested against the discontinuance of these annual reports. In reply the Director has stated that there was no direct provision of law authorizing an annual expenditure of from $20,000 to $40,000 to collect the statistics and that without such authority he did not feel justified in continuing this work, but that he would be perfectly willing to renew it if authorized to do so by appropriate legislation.

STATISTICS OF CITIES.

In compliance with recommendation 6, the 1912 financial statistics of cities will be completed and published by January 1, 1914. In order to insure the publication of these statistics by the close of the calendar year the tabulation has been arranged so as to make a bulletin of about 70 pages, whereas the report for 1911 contained 400 pages. The other provisions of this recommendation are also being carried out.

MORTALITY STATISTICS.

In accordance with recommendation 7, the reports on mortality statistics for 1911 and 1912 have been sufficiently curtailed to make possible their publication before the close of the calendar year, and the bulletin for 1912 has been abandoned. This practically clears the

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way so that the annual report for 1913 will be fully up to date. The Bureau anticipates no difficulty in issuing this report by about November 1, 1914.

Recommendation 8 is being carried out.

ARRANGEMENTS FOR PRINTING THIRTEENTH CENSUS REPORTS.

In compliance with recommendation 9 arrangements have been made with the Public Printer whereby the printing of the reports of the Thirteenth Census will be expedited so far as possible without undue interference with the work on other Government publications.

AGRICULTURE.

A number of subjects pertaining to agriculture were considered from time to time as proper for future analysis and special reports. After the Thirteenth Census reports, as such, had been completed, it was deemed wise to undertake the preparation of two bulletins, each covering a special subject which had been considered only briefly, or not referred to at all, in the general reports. Such a bulletin, pertaining to "Plantation systems of conducting agriculture in the Southern States," is now in course of preparation. A chapter on this subject was included in Volume V of the Thirteenth Census reports, previously referred to. The other special bulletin, which shows character of tenure and size of farm operated, classified by age of farmer, is also in course of preparation. This latter bulletin contains a section relating to the stability of the agricultural population, showing, for white and colored farmers separately, by character of tenure, the length of the average period of occupancy of farms.

COTTON STATISTICS.

During the fiscal year beginning July 1, 1913, there will be issued 10 reports showing the quantity of cotton ginned up to specified dates during the ginning season; twelve—one for each month—showing the quantity of cotton consumed, stocks of cotton on hand, and number of active spindles; three giving statistics of cottonseed crushed and linters obtained; one summarizing the statistics for the production of cotton as reported by the ginners; and one summarizing the statistics for the consumption of cotton, stocks on hand, and spindles. These 27 reports will constitute a complete statistical presentation of the production and consumption of cotton in the United States during the year.

The Bureau has made arrangements for the more frequent publication of county statistics of cotton ginned. It had been the practice to publish county figures only for December 13 of each year and at the end of the season, the State totals alone being given at other times. There was, however, a great demand for information as to the quantity of cotton ginned in the individual counties up to the date of each ginning report, and the Census Bureau, accordingly, gave the local special agents permission to publish this information in the county newspapers just as soon as their reports could be received at the office in Washington and the data verified. The local papers throughout the Southern States have been greatly pleased by this action, and

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many of them have written the Bureau expressing their appreciation of it.

Requests have been made of ginners for suggestions in regard to improving the method of collecting and publishing statistics of the quantity of cotton ginned, and almost invariably the replies have indicated complete satisfaction with the way in which the work is now being done.

The Bureau of the Census has also arranged for an additional report on cottonseed and linters, which will show the quantity of seed crushed and linters obtained from the crop prior to December 1 of each year. Heretofore there have been only two reports issued annually on this important subject, one showing the quantity of seed crushed prior to January 1, and the other, published at the end of the crushing season, showing statistics of the total quantity treated; and prior to January, 1913, only one such report, issued at the end of the cotton season, had been made annually.

Before deciding to make an additional report on this subject the Bureau communicated by letter with all of the cottonseed-oil mills throughout the entire country. The replies indicated a great diversity of opinion in regard to the date to which the report should relate. Some of the mills even contended that the collection of these statistics was not desirable, and recommended that the work be abandoned. A vast majority of them, however, were of the opinion that the figures should be published at more frequent intervals, and some went so far as to recommend that they be collected and published monthly during the active season.

From these letters and other recommendations which have been received, the Bureau is satisfied that the publication of official statistics concerning the quantity of cottonseed crushed and linters obtained tends to reduce speculation in these commodities and to make for greater stability in price. The decision to publish another report showing the quantity of seed crushed and linters obtained from each crop prior to December 1 was based upon the recommendations of the majority of the mills.

TOBACCO STATISTICS.

The Bureau of the Census has been able to make more satisfactory cooperative arrangements with the Internal-Revenue Service in connection with the collection of statistics of stocks of leaf tobacco for the report issued November 13, 1913 (relating to October 1), than it was able to make for either of the two preceding ones, so that it is now possible for the Bureau to secure, by correspondence with collectors of internal revenue, the names and addresses of the establishments covered by the law, together with all the information it requires in regard to delinquent establishments and establishments whose mail has been returned by the post offices as undelivered. The collectors have responded very promptly to the Bureau's requests for information of this character.

This arrangement obviates the necessity of sending special agents into the field to secure the information, thus materially reducing the cost of the work and enabling the Bureau to complete the canvass for the reports showing the quality of tobacco on hand October 1, 1913, at a much earlier date than was possible in the case of prior reports. The field work incident to the collection of the statistics was virtually

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completed on November 4 and, as already stated, they were made public November 13. The corresponding dates for the report of April 1 were May 22 and May 26, respectively.

Under the law tobacco dealers and manufacturers are allowed 10 days after the first day of April and the first day of October of each year in which to make their reports. The law further provides that the Director of the Census shall make a demand in writing of all persons who have failed to furnish the statistics within this time, and that such persons shall be given an additional 20 days. It, therefore, requires from 30 to 40 days to collect the reports of the quantity of tobacco on hand, so that it is virtually impossible to publish the statistics at a much earlier date than that at which they were published for the report of October 1, 1913.

IMPROVEMENT IN METHODS OF REPORTING VITAL STATISTICS.

In connection with the extension of the registration area for vital statistics, it is desirable to increase the accuracy of the information received. It is also important that the methods of reporting and the presentation of the data in the registration States be standardized. With these objects in view, a second edition of the Physicians' Pocket Reference to the International List of Causes of Death has recently been prepared and is now in course of distribution to all physicians in the United States, accompanied by a special circular letter signed by the Director, and by additional multigraph letters to the physicians in certain States. A reprint of the Manual of the International List of Causes of Death, prepared for the use of registration offices in the compilation of State and city reports, has also been published since the close of the fiscal year 1913.

OFFICIAL REGISTER OF THE UNITED STATES.

Work on the Official Register of the United States is progressing rapidly. The necessary information has been obtained from the several departments and offices, as provided by law, and its compilation is now well toward completion.

The Census Bureau encountered increasing difficulty in the preparation of Volume II (relating to the Postal Service) of each succeeding issue of the Official Register. This volume in 1911 contained 774 pages, and the cost of printing alone was $12,600. It was necessary to obtain the names of the employees in the Postal Service by correspondence with each postmaster in the United States. The number of such employees on June 30, 1913, was 290,605. The task of preparing this volume was of such magnitude that a period of at least six months usually elapsed between the date to which it related and the date of its publication.

In view of these facts it was believed by the officials of the Census Bureau and of the Post Office Department that the practical value of this volume was not sufficient to justify the labor and expense involved in its preparation; and in compliance with recommendations made by those officials, the following provision was incorporated in the urgent deficiency act for 1914, approved October 22, 1913:

> Hereafter the Official Register of the United States shall not contain the names of those persons heretofore published in Volume II relating to the postal service, namely, postmasters, assistant postmasters, clerks in post offices, city

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and rural carriers, employees of the sea-post service, employees of the Railway Mail Service, employees of the mail messenger service, and mail contractors; nor shall it contain the statement of allowances made to contractors for carrying the mails or the list of ships and vessels belonging to the United States, as heretofore published in the said Official Register; and all Acts or parts of Acts inconsistent with the foregoing provision are hereby repealed.

This legislation will greatly simplify the preparation of the Official Register and will very materially decrease the expense of the work.

The Director of the Census has called attention to the fact, already pointed out by his predecessor, that the Official Register in its present form is unnecessarily cumbersome and expensive. The volume as now published contains an alphabetical list or directory of all Government employees except those in the Postal Service, the name of each employee being followed by data showing the department and bureau or office in which employed; the official title; compensation; State or country of birth; congressional district, county, and State from which appointed; and place of employment. The information is presented in so abbreviated a form that in nearly all cases it occupies but a single line following the name of the person to whom it relates. Preceding the directory are lists, arranged by departments and offices, showing the principal officials in each, without clerical or other minor employees. This form is very compact and permits the presentation of the data in the smallest possible space. Nevertheless, the directory volume of the Official Register for 1911 contained 878 quarto pages.

The preparation of the Register is becoming more and more difficult with the growth and increasing complexity of the Government service; and the task of furnishing the required information is becoming more and more onerous for the executive departments and offices, especially in the cases of those departments which have services in the outlying possessions of the United States and in foreign countries. It is, therefore, very difficult to compile and issue the Register before the assembling of the regular session of Congress in December; and during the period between July 1 and the following December many changes—of which it is impracticable to make any record in the Register—are bound to occur.

In view of these conditions the adoption of the following plan, which modifies slightly the one proposed by the former Director, is recommended:

1. The establishment of a card directory, prepared and maintained by the Civil Service Commission from information furnished by the executive departments and independent offices, showing the name and status of every person in the Government service except the officers and enlisted men of the Army, Navy, Marine Corps, and Revenue Cutter Service. Lists of officers of the Army, Navy, and Marine Corps are already published annually in the Army Register and Navy Register, issued by the War and Navy Departments, respectively.

2. The elimination from the Official Register of detailed lists of all employees, by name.

3. The publication annually by the Bureau of the Census of an Official Register containing—

(*a*) A list of all employees of the Government (except officers and enlisted men in the Army, Navy, Marine Corps, and Revenue-Cutter

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Service) whose duties are of an executive, supervisory, technical, or professional character, and whose compensation is $2,000 or more per annum.

(*b*) Statistics relating to the Government service, to be prepared from the Civil Service Commission's card directory.

This plan, if adopted, will result in very material saving to the Government, will preserve all the valuable features of the present Official Register, and will provide for a complete and up-to-date record of the entire personnel of the Government in one central office (the Civil Service Commission), from which the Census Bureau will be able to prepare accurate statistical statements when called upon to do so by the President or by Congress.

A bill substantially embodying the foregoing plan (except that $1,500 instead of $2,000 was fixed as the lowest compensation of employees whose names should be included in the Official Register) was introduced in the House of Representatives on August 8, 1913, by Hon. W. C. Houston, of Tennessee.

WEALTH, DEBT, AND TAXATION.

An important and extensive intercensal investigation which has been planned for the fiscal year 1914 is that relating to wealth, debt, and taxation. The permanent census act authorized a decennial investigation of "All public indebtedness, values, taxation, and expenditures." An inquiry relating to the year 1902 was made under the authority of this act. In view of the fact that the great body of data contained in the report based upon that inquiry covered, for the various governmental units, the period of one fiscal year closing at some time between July 1, 1902, and June 30, 1903, it seemed wise to make the investigation now under consideration for the fiscal year ending between July 1, 1912, and June 30, 1913. This is six months earlier than recommended in the annual report of the former Director of the Census. The change has been decided upon for the two following reasons: (1) That the data contained in the report will thus relate, as nearly as possible, to a period 10 years later than that covered by the last report, and will therefore be more nearly comparable in all details; and (2) that it will thus be possible to compile a very large part of the report from published reports of the various governmental units to be investigated, with the result of effecting a very material saving to this Bureau.

Prior estimates made by the Bureau of the Census called for an appropriation of $100,000 to provide for travel and subsistence of clerks engaged in this investigation. The urgent deficiency act for the fiscal year 1914, however, authorized the use, during that year, of only $50,000 of the unexpended balance for collecting statistics for the fiscal year 1913; and the Bureau will make the best use possible of this sum in conducting the inquiry on wealth, debt, and taxation. So far as practicable the printed reports of the United States and of the various States and other governmental units, and such other data as may be available, will be used by the Census Bureau as sources of information. The Bureau is now engaged in collecting such of these reports as can be secured without cost, and has already accumulated a considerable amount of material. A careful

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analysis of the data at hand is being made, with a view to ascertaining just what can be done with printed reports and other available data before Census employees enter the field to make the actual canvass. While the investigation of wealth, debt, and taxation is an extensive one, it is not proposed to employ any additional clerks or any considerable number of special agents to perform any part of the work. Aside from the use of published reports and other material which is being accumulated, the statistics will be collected largely by sending clerks from the regular permanent force of the Bureau into the field. A small number of special agents will be necessary to supplement the regular permanent force. The Post Office Department has been requested to cooperate with the Department of Commerce by directing postmasters in small towns, to which it would not be feasible to send agents of the Census Bureau, to furnish certain of the data needed. All of the results of this inquiry will be tabulated by the regular force in the office.

The scope of the forthcoming report on wealth, debt, and taxation will be substantially the same as that of the preceding one, which was prepared some 10 years ago.

USE OF RECORDS FOR GENEALOGICAL PURPOSES AND TO DETERMINE AGES OF APPLICANTS FOR PENSIONS.

Constant use is made of the schedules of former censuses for genealogical purposes. Of late the records of the censuses of 1850 and 1860 have been proving of immense value to applicants for pensions who are unable to furnish other satisfactory evidence of their ages; and the labor of examining the schedules in order to secure such evidence has become so great that it has been found necessary to obtain the detail of a force of 28 clerks from the Pension Bureau to perform this work.

ESTIMATES OF POPULATION.

The Bureau contemplates the issuance, early in the calendar year 1914, of a bulletin giving estimates of the population of the United States, of the various States and counties, and of cities of 8,000 population or over in 1910, for the years 1911, 1912, 1913, and 1914. Two similar bulletins were issued during the period between the Twelfth and Thirteenth Censuses.

CENSUS OF MANUFACTURES, 1914.

Under the existing law a census of manufactures is taken every fifth year. The canvass is made in the fifth and tenth years of each decade and relates in each case to the calendar year preceding the one in which the statistics are collected. The next report will, therefore, cover the year 1914 and the canvass will be made in 1915.

The delay in compiling and publishing the statistics for previous censuses of manufactures has been due largely to the fact that the preliminary work incident to the canvass was not finished in time to have the field work begun promptly at the beginning of the year. While the field work can not start until January 1, 1915, it is the purpose of the Bureau to begin at once to make the preparatory arrangements. The preliminary work will be done thoroughly and

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everything will be in shape to put a large force of special agents and clerks in the field promptly with the beginning of 1915, so that the canvass can be pushed to completion and the results printed at a much earlier date than has been possible heretofore.

CENSUS OF AGRICULTURE, 1915.

The Thirteenth Census act contains the following provision:

> That there shall be in the year nineteen hundred and fifteen, and once every ten years thereafter, a census of agriculture and live stock, which shall show the acreage of farm land, the acreage of the principal crops, and the number and value of domestic animals on the farms and ranges of the country. The schedule employed in this census shall be prepared by the Director of the Census. Such census shall be taken as of October first, and shall relate to the current year. The Director of the Census may appoint enumerators or special agents for the purpose of this census, in accordance with the provisions of the permanent Census Act.

This section undoubtedly gives the Director of the Census all of the necessary authority, providing proper appropriations are made, for the taking of the census of agriculture in 1915. It is probable that a few slight changes in the law will be desirable, particularly with reference to scope, the method of taking the census, and the time of the year at which it shall be taken. But no legislation will be necessary prior to the regular session of Congress beginning in the early part of December, 1914, when estimates for appropriations needed will be submitted, as well as requests for such slight changes in regard to date of enumeration, scope, and method as may seem desirable at that time.

OFFICE FORCE.

CHANGES IN ADMINISTRATIVE FORCE.

At the beginning of the fiscal year a number of important changes were made in the administrative force of the Bureau. During the period between the Twelfth and Thirteenth Censuses the Bureau had its own Disbursing Office and Appointment Division, under the supervision of the disbursing clerk. During the Thirteenth Census period the work of these two divisions was, of course, very much heavier, and provision was made for a separate appointment clerk to take charge of the Appointment Division. The administrative force also included an Assistant Director during the Thirteenth Census period. At the close of this period, however, the positions of Assistant Director, appointment clerk, and disbursing clerk ceased to exist. As much as possible of the work which had been performed by the Disbursing and Appointment Divisions was transferred to the corresponding divisions of the Department, the remainder of their duties being placed under the supervision of the Chief Clerk of the Bureau.

At the close of the Thirteenth Census period the number of chief statisticians, which had been increased to five during that period, was again reduced to four. Several reductions were made at the same time in the salaries of administrative officials.

The appropriations for the compensation of administrative officials for the fiscal year 1914 were the same as those for 1913.

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PERMANENT EMPLOYEES.

During the Thirteenth Census period the Bureau operated under a lump-sum appropriation. The Thirteenth Census act, however, limited the number of clerical positions at salaries above $1,200 to 116. For several years prior to that period the number of such positions had been, under the appropriation acts, only 36. The appropriation act for the fiscal year 1913 provided for a total of 610 permanent employees, or a slightly smaller number than the Bureau had had during the fiscal year 1909 (626), prior to the Thirteenth Census period. Sixty-three clerks at salaries above $1,200 were authorized. This number, while much greater than the number of such clerks prior to the Thirteenth Census period, was still only a little more than half as great as the corresponding number (116) during that period. It became necessary, therefore, to demote a large proportion of the employees in the higher salary classes, together with some of those in the lower ones; the total number of demotions was 185 (this number including 5 demotions of special agents and 15 of subclerical employees). The Census Bureau, when opportunities for promotion have arisen, has in nearly all cases given preference to these demoted employees. Vacancies in the higher-paid positions occur but slowly, however, and during the fiscal year it was possible to restore, in all, only 55 employees to their former salaries; and only 9 of the 77 employees who had been demoted from salaries of $1,400 or more were restored to their former compensation.

The appropriation act for 1913 provided that the Civil Service Commission, in certifying eligibles from the examination registers for appointment to positions on the permanent roll of the Bureau during the fiscal year 1913, at salaries of $1,200 or less, should, so far as practicable under the law of apportionment, give preference to those who had had at least one year's experience in census work. A statistical-clerk register was established by the Civil Service Commission for the special use of the Census Bureau. Prior to the establishment of this register, appointments to the Bureau's permanent force were made principally from the departmental-clerk register, but later, after the statistical-clerk register had been established, most of the permanent appointments were made therefrom. The majority of the clerks drawn from these two registers had been temporary Thirteenth Census employees, and were given preference in certification under the provision of law just mentioned.

The appropriation act for 1914 created 7 additional positions at $1,400 and 5 at $1,200, and reduced the number of $900 places by 1, thus increasing by 11 the total number of positions on the permanent roll of the Bureau, and bringing the number of places above $1,200 up to 70, equal to 13 per cent of the total number of clerical positions, as compared with from 24 to 55 per cent in other branches of the departmental service.

One of the objects which it was desired to attain by the establishment of a permanent Census Bureau was the maintenance of a nucleus for the large force which must be employed during the decennial census periods. A considerable part of this nucleus must consist of employees thoroughly trained in census work and qualified to discharge responsible supervisory duties. Persons so qualified can demand larger salaries than the average clerk, and if they are unable to

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obtain them in the Census Bureau, will seek them elsewhere. For this reason the Bureau is constantly losing some of its most valuable employees and is obliged to train, at Government expense, others to take their places. The very fact that the Bureau must expand so greatly at each decennial census period constitutes a strong argument in favor of granting it a larger, rather than a smaller, proportion of high-salaried employees than is found in other branches of the Government service. During the fiscal year 1913, following the reorganization of the force and the enforced demotion of so large a proportion of the high-salaried employees, 51 experienced clerks resigned to seek employment elsewhere, where the prospects for advancement were superior to those in the Census Bureau.

With a view to remedying this condition so far as possible without asking for a material increase in the appropriation for salaries, a proposal for reclassification will be submitted to Congress. The present and the proposed constitution of the office force of the Bureau, exclusive of special agents, are shown in Appendix I.

The object of this proposed change is twofold: First, to provide a larger proportion of places in the higher-salaried classes; and second, by increasing the number of salary classes to make possible more frequent promotions.

As already indicated, an unduly large proportion of the Bureau's employees are in the $1,200 class. The proposed reclassification, while calling for only a slight increase in the total appropriation for salaries, provides for a material increase in the number of higher-salaried positions. The estimate calls for 12 clerks at $1,800, as compared with 11 at present; for 12 at $1,680 and 15 at $1,560, or 27 at an average salary of about $1,620, as compared with 20 at $1,600 in the present classification; and for 18 at $1,440, 23 at $1,380, and 34 at $1,320, or an aggregate of 75 at salaries ranging from $80 below to $40 above $1,400, as compared with 39 at $1,400 in the present classification. The estimate calls for 559 officials and employees (exclusive of special agents) above the subclerical grade, as compared with 560 such officials and employees in the force as at present constituted.

Furthermore, as already stated, the proposed reclassification, if carried into effect, will, by providing so many more salary classes, make possible more frequent promotions, with a resultant improvement in the esprit de corps.

TEMPORARY FORCE.

The Census Bureau's appropriations for the fiscal year 1912 were insufficient to enable it to maintain its force of temporary Thirteenth Census employees throughout the fiscal year. Immediately upon the passage of the urgent deficiency act in December, 1911, steps were taken to drop the temporary force as rapidly as possible, and by February 29, 1912, practically all of these employees had been dropped from the Bureau's roll. In view of the unfinished condition of much of the Thirteenth Census work, an appropriation of $120,000 for temporary clerical service was requested for the fiscal year 1913, in order that this work might be brought to completion as rapidly as possible. On August 23, 1912, this amount was appropriated by Congress, it being stipulated that not to exceed 175 clerks should be employed, at salaries

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not to exceed $900 per annum, that their terms of service should expire on June 30, 1913, and that they should be appointed from among former Thirteenth Census employees. The Bureau appointed these 175 temporary clerks at $720 per annum, apportioning them (although not required to do so by the terms of the appropriation act), so far as practicable, among the States on the basis of their population, but, in order to avoid bringing persons to Washington from a distance for a comparatively short period of service, preference was given to those locally available. It was possible in most cases to give a State its quota of appointments from among persons who, while legal residents of that State, were actually living in or near Washington at the time.

Inasmuch as the appropriation act did not become a law until late in August, it was not possible to appoint any of these temporary clerks before September 1, and many were not appointed until about October 1. Consequently, the appropriation of $120,000 was considerably more than sufficient to compensate these 175 employees until the end of the fiscal year. The Bureau, therefore, asked for authority to increase the number of temporary clerks without an increase in the amount of the appropriation. This authority was granted by the appropriation act for the fiscal year 1914, which was approved March 4, 1913. The temporary force was, accordingly, increased until it reached a maximum of 265 in May and June, 1913. On June 30, 1913, all these temporary positions lapsed under the terms of the act creating them.

DISTRIBUTION OF FORCE.

The distribution of the office and field force of the Bureau of the Census on October 31, 1913, is shown in Appendix II.

QUARTERS.

The building in which the Census Bureau is at present housed is unsatisfactory in respect to sanitary and lighting conditions and in respect to danger from fire. Greater space for the storage of records and equipment is also highly desirable. A fireproof building, erected with proper regard for lighting and sanitary conditions, and having ample storage space, would facilitate the work of the Bureau and would greatly increase the comfort and well-being of its employees. In view of the vast quantity of valuable records which must be stored, many of which could not be replaced if destroyed, the need of a fireproof building is especially pronounced; and while the Census Bureau remains in its present quarters there is great need of a larger fireproof vault for the storage of population schedules of past censuses, as the capacity of the vault now in use is insufficient to meet the Bureau's requirements.

In this connection the Director of the Census, on September 27, 1913, wrote the Secretary of Commerce as follows:

> There are in my custody in the Census building a number of volumes of the returns of the census from 1790 to 1900, which are of great value, and it would be impossible to replace them if they were destroyed. The names of the heads of families returned at the census of 1790 were considered of such great value that they were published, in order that they might be placed on record in different libraries and render it impossible for all to be destroyed.

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These returns, however, are incomplete, as we have no returns for the State of Delaware for 1790; none for the State of Georgia for 1790, 1800, and 1810; Kentucky is missing for 1790 and 1800; New Jersey from 1790 to and including 1820; Tennessee from 1790 to and including 1810, and Virginia for 1790 and 1800. A number of the missing returns referred to were destroyed when the Capitol was burned by the British, and the others by fires in the Patent Office.

In addition to the records of population, we have the following-named bound volumes:

Subject.	Number of volumes.
Agriculture	644
Mortality	131
Social statistics	43
Industries	197
Defectives	68
Total	1,083

The total number of volumes from 1790 to 1880 comprised 4,622. In 1890, when the schedules were not bound, we had approximately 44,000 bundles of schedules. For 1900, we have 2,812 volumes. The population returns for 1910 are in a fireproof vault and fill it completely. They have not been bound and are constantly referred to. The census returns from 1790 to and including 1900 are continually referred to for genealogical purposes, and the returns for 1850 and 1860 are constantly being examined to secure data showing the ages of pensioners, as they are unable to obtain any other record evidence of their ages. These volumes, especially, are proving invaluable and could not, of course, be replaced if they were destroyed, and as time passes by the census returns will prove of greater value, as it is the only list to which individuals can refer in order to establish relationship in their families, often required in settling estates.

In addition to the census returns, we have many division records, the loss of which would cause great embarrassment and thousands of dollars would have to be expended to attempt to replace them. For instance, the Geographer's Division has the plans of division into enumeration districts, into which the country was divided in 1910. These official records, if lost, could not be replaced and would involve great expense in the preparation for the Fourteenth Census. There are in all the divisions of the Census Bureau division records that are essential in preparing for another census, and they would all be lost if there was a fire which destroyed the present building occupied by the Census Bureau. As a precautionary measure, I have had the chief clerk post "No smoking" placards throughout the building and have issued an order positively prohibiting smoking in any part of the present building. While orders against smoking were previously issued by my predecessors, I have been informed that no action was taken to enforce them in toilet rooms and among the higher officials. It will probably be necessary for me to take drastic action in some case in order to show, by example, that there must be no smoking in the present Census building.

The necessity for a fireproof vault to inclose these records has been conceded at every enumeration, and when the present Census building was built a vault was placed therein, which was large enough to hold all the returns of population from 1790 to 1900, except the schedules for 1890. This vault now contains only the unbound population schedules for 1910. The bound volumes containing the returns of the other censuses, except 1890, have been placed on metallic shelves in the northern part of the large east room. The census schedules from 1790 to 1900, except those of 1890, now occupy in the Census Bureau a space 45 by 26 feet, 12 feet high. The population returns for the census of 1890 require about as much space as the returns for the other enumerations; that is, if we attempted to place the returns in a vault, it would have to have approximately 2,340 square feet for cases at least 12 feet high.

To the foregoing letter the Secretary of Commerce, on October 3, 1913, replied as follows:

Referring to your communication of the 27th on conditions as regards the fire risk to valuable records in the building at present occupied by your Bureau,

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let me say that your instructions prohibiting smoking are approved, as is also your intention to enforce them strictly. Kindly give consideration to any other precautions that may further provide safety, such as absolute cleanliness in out-of-the-way places, supervision of the night watchmen, provision of fire-extinguishing appliances readily accessible, arrangements for the prompt removal of the more valuable part of the records in case of fire. In short, take whatever steps your judgment suggests and the means at your disposal permit to prevent loss.

Take a note to bring the matter again to my attention the latter part of November that I may bring the subject before both Houses of Congress in the hope that they may provide funds which will permit our putting these invaluable records into a condition of safety. In the meantime I suggest your sending a copy of your letter to me and of this, my reply, to the Chairmen of the House Committee on the Census and the Senate Committee on the Census, in order that they may be fully informed.

APPROPRIATIONS, EXPENDITURES, ETC.

In Appendix III is presented a financial statement for the permanent Census Bureau for the fiscal year 1913 and for the Thirteenth Decennial Census from July 1, 1909, to June 30, 1913.

COMPARATIVE COST OF PRINTING FOR TWELFTH AND THIRTEENTH CENSUSES.

It is impossible to make an exact comparison of the printing costs of the Twelfth and Thirteenth Censuses, owing to the radical difference between the methods of printing employed at the two censuses. A rough comparison may be made, however.

There was spent for Thirteenth Census printing up to June 30, 1912, out of the lump-sum appropriations available for the expenses of the Thirteenth Census, $303,349.73. In February, 1912, an estimate of $272,000 to complete the printing of the results of the Thirteenth Census was submitted to Congress. This item was included in the legislative, executive, and judicial appropriation act for the fiscal year 1913, and the same act for 1914 reappropriated the unexpended balance of this amount, all or substantially all of which will be spent. The total cost of printing the results of the Thirteenth Census will not, therefore, exceed the sum of these two amounts, or $575,349.73. The approximate cost of the Twelfth Census printing, as given on page 29 of the Annual Report of the Director of the Census for the Fiscal Year 1908, was $820,000.

Careful computations have been made for the purpose of verifying this figure, so far as it was possible to do so, and it is found to be substantially correct. There will be, therefore, a decrease of about $245,000, or almost 30 per cent, in the printing cost of the Thirteenth Census as compared with that of the Twelfth.

In this connection it may be stated that the estimated cost of printing Thirteenth Census publications was given as $800,000 on page 29 of the Annual Report of the Director of the Census for the Fiscal Year 1908, already referred to.

It may not be inappropriate here to mention briefly a few of the more salient points of difference between the methods of publishing and distributing the results of the two censuses.

At each census the Abstract has been published in much larger numbers than any of the other volumes. In all, 66,000 copies of the

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Abstract of the Twelfth Census were printed, 35,000 of which had been printed up to January 1, 1904, as compared with 58,425 copies of the Abstract of the Thirteenth Census up to January 1, 1914. The Abstract of the Thirteenth Census contains about three times as much material relative to the United States as a whole as was contained in the Abstract of the Twelfth Census.[a]

Five thousand copies of each of the large final volumes of the reports of the Thirteenth Census have been or will be printed, as compared with from 5,000 to 25,000 each of the volumes constituting the Twelfth Census reports.

Greater care has been taken at the Thirteenth Census than ever before in respect to the distribution of publications, an earnest effort having been made to furnish them only to such persons and institutions as really desire them.

The most important feature of the Thirteenth Census series of publications, and one which is not found in those of any previous census, is the provision of State supplements to the Abstract containing complete and detailed statistics, more comprehensive in some respects than those found even in the large volumes constituting the final reports of former censuses. The local statistics of previous censuses could be secured only in the preliminary bulletins or in the final reports. Comparatively few could obtain access to the final reports, and even then it was difficult to assemble all the data with reference to any one locality from the numerous tables scattered through the various volumes.

It will be seen, therefore, that, although smaller editions of the final reports of the Thirteenth Census have been issued than were issued of those of the Twelfth, the substantial results of the last census, in such form as to be readily grasped, have been placed in the hands of a much larger number of persons than received the reports of the Twelfth Census, and at the same time at a materially reduced cost for printing.

FISCAL YEAR 1914.

The appropriation for 1914 was $1,122,820. The item for salaries was increased to $711,240, the item for collecting statistics reduced to $354,000 (as compared with $387,000 in 1913, this amount including $45,000 for collecting statistics of cotton and tobacco), and the item for tabulating machines reduced to $10,000. No new appropriation was made for printing and binding the results of the Thirteenth Census, but the unexpended balance of the 1913 appropriation for Thirteenth Census printing was reappropriated and made available for 1914.

FISCAL YEAR 1915.

The amount estimated for the fiscal year 1915 is $1,709,720. The estimate for salaries has been increased to $722,140 (see Appendix I, and discussion under "Office force—Permanent employees"), that for tabulating machines to $15,000, and that for collecting statistics to $925,000. The estimates for the other items are the same as the amounts appropriated for 1914.

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[a] For description of the Abstract, see p. 225.

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The increase of $5,000 in the estimate for tabulating machines is made because of the increase of work in the mechanical laboratory incident to the census of manufactures.

The large increase ($571,000) in the estimate for collecting statistics is accounted for mainly by the item of $566,400 for the quinquennial census of manufactures, which will relate to the calendar year 1914. The last previous census of manufactures, relating to the calendar year 1909, was taken at a cost for field work of $517,044. The increase in the estimated cost is due largely to the fact that the census of 1909 was taken in connection with other field work, so that the cost of each branch was greatly reduced.

An item of $18,000 is included for transcripts of birth records. No corresponding appropriation was made for 1914. Slight increases are made in the items for transcripts of death records and statistics of cities, and slight decreases appear in the items for cotton statistics and tobacco statistics.

A reduction of $4,400 is made in the estimate for salaries of expert special agents to offset an item of that amount for salaries of two assistant statisticians (new positions) at $2,200.

Respectfully submitted.

WM. J. HARRIS,
Director of the Census.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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APPENDIXES.

APPENDIX I.

PROPOSED RECLASSIFICATION OF FORCE.

PRESENT OFFICE FORCE.		OFFICE FORCE ACCORDING TO ESTIMATES FOR 1915.	
Director	$6,000	Director	$6,000
Chief Clerk	2,500	Chief Clerk	2,500
		Chief statistician	3,250
4 chief statisticians at $3,000	12,000	2 statisticians at $3,000	6,000
		Statistician	2,750
		2 assistant statisticians at $2,200 [a]	4,400
Geographer	2,000	Geographer	2,000
Stenographer	1,500	Stenographer	1,500
8 expert chiefs of division at $2,000	16,000	8 expert chiefs of division at $2,000	16,000
11 clerks at $1,800	19,800	12 clerks at $1,800	21,600
20 clerks at $1,600	32,000	12 clerks at $1,680	20,160
		15 clerks at $1,560	23,400
		18 clerks at $1,440	25,920
39 clerks at $1,400	54,600	23 clerks at $1,380	31,740
		34 clerks at $1,320	44,880
		54 clerks at $1,260	68,040
305 clerks at $1,200	366,000	149 clerks at $1,200	178,800
		46 clerks at $1,140	52,440
		34 clerks at $1,080	36,720
83 clerks at $1,000	83,000	41 clerks at $1,020	41,820
		18 clerks at $960	17,280
86 clerks at $900	77,400	85 clerks at $900	76,500
Subclerical force	38,440	Subclerical force	38,440
Total	711,240	Total	722,140

APPENDIX II.

STATEMENT SHOWING NATURE AND DISTRIBUTION OF OFFICE AND FIELD FORCE, OCTOBER 31, 1913.

OFFICIALS.

Chief Clerk	WILLIAM L. AUSTIN.
Chief statisticians:	
Population	WILLIAM C. HUNT.
Statistics of cities	LE GRAND POWERS.
Manufactures	WILLIAM M. STEUART.
Vital statistics	CRESSY L. WILBUR.
Expert special agent in charge of agriculture	JOHN LEE COULTER.
Expert special agent in charge of revision and results	JOSEPH A. HILL.
Geographer	CHARLES S. SLOANE.
Expert chiefs of division:	
Population	WILLIAM H. JARVIS.
	EDWARD W. KOCH.
Agriculture	ARTHUR J. HIRSCH.
	HICKMAN P. CHILDERS.
Manufactures	JOSEPH D. LEWIS.
	FRANK L. SANFORD.
Vital statistics	RICHARD C. LAPPIN.
Publication	HARRY H. PIERCE.
Chief mechanician	E. M. LABOITEAUX.

[a] The two assistant statisticians at $2,200 are in lieu of two office special agents at $6 per day, whose compensation would be paid from the appropriation for collecting statistics. A corresponding reduction has been made in the estimate for this item, so that, while the increase in the estimate for salaries as compared with the appropriation for 1914 is $10,900, the net increase in the estimate for compensation of office employees, including special agents, is only $6,500.

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CLERICAL FORCE.

Stenographer, $1,500	1	Clerks:	
Clerks:		$1,000	83
Class 4	11	$900	81
Class 3	20	Total	536
Class 2	38		
Class 1	302		

SUBCLERICAL FORCE.

Engineer, $1,000	1	Assistant messengers, $720	4
Electrician, $1,000	1	Messenger boys, $480	4
Skilled laborers:		Watchmen, $720	5
$1,000	2	Firemen, $720	3
$900	4	Charwomen, $240	14
$720	10	Total	59
Unskilled laborers, $720	8		
Messengers, $840	3		

MACHINE-SHOP FORCE.

Electrical expert, $1,600	1	Mechanician, $1,200	2
Mechanical expert, $1,600	1	Total	5
Mechanical expert, $1,200	1		

SPECIAL-AGENT FORCE.

Experts, agents for general field work, etc	81

SUMMARY OF CENSUS FORCE.

Officials	17	Special agents (general force)	31
Clerical	536	Total office force	648
Subclerical	59		
Machine shop	5		
Special agents to collect statistics of cotton			750

APPENDIX III.

FINANCIAL STATEMENT.

FISCAL YEAR 1918.

Administrative:			
Salaries for administrative places		$36,179.15	
Salaries for division of correspondence and mail		20,026.50	
Salaries for library		4,987.24	
Salaries for watch, labor and char forces		26,580.07	
Rent		21,000.00	
Stationery		9,809.20	
Miscellaneous expenses		14,767.29	
Books and periodicals		487.72	
Total			$133,897.17
Geographer's division: Salaries			19,740.23
Machine shop:			
Salaries		23,246.00	
Materials, supplies, etc		3,349.12	
Total			26,595.12
Thirteenth Census work:			
Population—			
Supervision	$11,518.35		
General and State reports	98,458.32		
Occupations	177,985.38		
Foreign-born	445.12		
Tenure of homes	16,138.59		
Total		304,545.76	
Agriculture—			
Supervision	8,362.38		
General and State reports	31,396.73		
Color, tenure, and size	16,651.42		
Plantations and ownership of tenant farms	14,913.17		
Irrigation	2,831.29		
Total		74,154.99	

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Thirteenth Census work—Continued.			
Manufactures—			
Supervision [a]	$9,708.99		
Completion of manufactures reports	41,819.74		
Industrial districts	1,276.62		
Mines and quarries	17,416.89		
Total		$70,222.24	
Institutions		39,167.07	
Revision and results		24,319.79	
Publications		11,333.21	
Total			$523,743.06
Annual investigations:			
Cotton		253,291.44	
Tobacco		25,509.76	
Electrical industries		24,344.18	
Forest products		19,045.37	
Vital statistics		81,709.16	
Statistics of cities		82,371.41	
Total			486,471.32
Miscellaneous			7,393.91
Grand total			1,197,840.81

	Appropriations.	Expenditures.	Balance.
Expenses of the Thirteenth Census, 1913	[b] $102,339.30	$99,998.68	$2,340.62
Salaries, Bureau of the Census, 1913	[b] 593,823.28	574,250.58	19,572.70
Temporary clerks, Bureau of the Census, 1913	120,000.00	116,194.66	3,805.34
Tabulating machines, Bureau of the Census, 1913	[c] 26,643.93	26,595.12	48.81
Collecting statistics, Bureau of the Census, 1913	342,000.00	291,137.25	50,862.75
Tobacco statistics, Bureau of the Census, 1913	15,000.00	14,999.83	.17
Cotton statistics, Bureau of the Census, 1913	30,000.00	28,543.97	1,456.03
Rent, Bureau of the Census, 1913	22,080.00	21,000.00	1,080.00
Contingent expenses, Department of Commerce and Labor, 1913	25,500.00	25,120.72	379.28
Total	1,277,386.51	1,197,840.81	79,545.70

COST OF THIRTEENTH DECENNIAL CENSUS TO JUNE 30, 1913.

Thirteenth Census appropriations:	
Paid to Dec. 31, 1912	$15,171,593.25
Paid, Jan. 1, 1913, to June 30, 1913	1,328.72
Appropriations for fiscal year 1913:	
Salaries of employees on Thirteenth Census work	523,743.06
Printing	152,916.41
Total	15,849,581.44

COST OF THIRTEENTH CENSUS PRINTING.

Payments to June 30, 1912	$303,349.73
Payments from 1913 appropriation	152,916.41
Balance of appropriation for Thirteenth Census printing (all will probably be used)	119,083.59
Estimated total Dec. 31, 1913	575,349.73

[a] Includes cost of supervision for forest products, cotton, tobacco, and electrical industries.

[b] Because of complications arising from the fact that the Bureau operated under joint resolutions of Congress from July 1 to Aug. 23, 1912, inclusive, the appropriation for "Salaries, Bureau of the Census, 1913," was divided by the Treasury Department into two parts: One, under the head "Expenses of the Thirteenth Census, 1913," amounting to $102,339.30; and the other, under the original head of "Salaries, Bureau of the Census, 1913," amounting to $593,823.28. The sum of these two items, $696,162.58, is a little less than the amount originally appropriated, $696,340.

[c] Includes $643.93 reimbursement for work done for Bureau of Immigration.

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REPORT

OF THE

COMMISSIONER OF FISHERIES

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REPORT

OF THE

COMMISSIONER OF FISHERIES.

DEPARTMENT OF COMMERCE,
BUREAU OF FISHERIES,
Washington, December 13, 1913.

SIR: There is submitted herewith a report giving an outline review of the operations of the Bureau of Fisheries during the fiscal year ended June 30, 1913.

PROPAGATION AND DISTRIBUTION OF FOOD FISHES.

GENERAL EXTENT OF THE WORK.

In this most extensive and important branch of the Bureau of Fisheries no material changes were made in 1913 in the methods heretofore pursued, but the extension of the work into new fields through the establishment and operation of inexpensive auxiliary stations at advantageous points resulted in an output exceeding that of any previous year, though the available expenditures were not increased. In other words, notwithstanding the higher cost of labor and materials the Bureau has succeeded in producing fish at a smaller cost per unit than ever before.

The outcome of fish-cultural operations in any given field is governed largely by local climatic conditions prevailing during the comparatively short spawning seasons of the various species. Storms, freshets, and drought prevent the ascent of river fish to their spawning grounds, rendering ineffective the preparations made for taking their eggs; abnormal heat or cold, with sudden changes in water temperature, may cause heavy losses of eggs and fry in the early stages of development; still other natural agencies often interfere with the most carefully planned operations. The most serious conditions with which the Bureau has to contend, however, are of an artificial nature. The construction of dams without efficient fishways; the operation of nets in prohibited waters or at the mouths of streams, thus preventing the adult fish from reaching their spawning grounds; and the destruction of fishes and fish food through water pollution, are some of the factors which nullify the fish-cultural work of the Bureau in some sections of the country; while the failure of some of the States to enact or enforce adequate protective laws, and the disposition of others to appropriate to their own use fields which have been developed and are already occupied by the Bureau, tend to hamper and curtail its activities.

Despite the scope and magnitude of its operations, the Bureau has difficulty, with its present facilities, in meeting the constantly growing demands from all sections of the country for fish to stock public

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and private waters. Salmonoid fishes, which are propagated by the artificial manipulation of the eggs, can be produced in sufficient numbers; but with a fuller realization of the benefits accruing from the maintenance of fish ponds on farms, as an inexpensive and ready food supply for home consumption, the demands for the black basses, crappies, sunfishes, catfishes, and other species adapted to pond culture, which are obtainable only through natural reproduction, have increased out of all proportion to the annual supplies available.

Following is a summarized statement of the output of food and game fishes during the fiscal year 1913. The total production, amounting to more than 3,863,000,000, showed a substantial gain over the previous year. More than 85 per cent of the product was distributed in the form of fry, and over 10 per cent was fertilized eggs which were either transferred to outside agencies for the completion of incubation or planted on the natural spawning grounds because of overcrowded condition of the hatcheries. The 45 species handled include the most important fishes of the coastal and interior waters.

SUMMARY, BY SPECIES, OF THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1913.

Species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.	Total.
Catfish			62,446	62,446
Carp			79,160	79,160
Buffalofish		3,080,000	4,212	3,084,212
Shad	3,394,000	133,244,850		136,638,850
Whitefish	73,720,000	393,880,000		467,600,000
Lake herring		4,730,000		4,730,000
Silver salmon	102,000	14,184,283	69,800	14,356,083
Chinook salmon	38,583,873	33,319,423	97,760	72,001,056
Blueback salmon	2,000,000	80,340,902		82,340,902
Humpback salmon		153,680		153,680
Dog salmon		19,479,000		19,479,000
Steelhead trout	980,000	4,300,225	138,410	5,418,635
Rainbow trout	1,106,000	901,370	1,150,957	3,158,327
Atlantic salmon		3,492,464	4,304	3,496,768
Landlocked salmon	224,000	253,546	80,196	557,742
Black-spotted trout	13,305,000	766,950	7,174,060	21,246,010
Loch Leven trout			75,200	75,200
Lake trout	6,612,000	20,594,600	3,024,924	30,231,524
Brook trout	1,239,000	5,280,452	6,014,645	12,534,097
Grayling	903,000	2,613,000		3,516,000
Smelt	4,500,000	1,850,000	27,000	6,377,000
Pike and pickerel			9,004	9,004
Crappie and strawberry bass			79,279	79,279
Rock bass			64,743	64,743
Warmouth bass			1,390	1,390
Small-mouth black bass		234,300	107,641	341,941
Large-mouth black bass		26,250	1,231,052	1,257,302
Sunfish (bream)			203,623	203,623
Pike perch	46,200,000	148,510,000		194,710,000
Yellow perch	11,000,000	365,723,000	25,132	376,748,132
White perch	20,000,000	449,120,000	721	469,120,721
Striped bass		7,234,000		7,234,000
Yellow bass			255	255
Cod	6,800,000	221,012,000		227,812,000
Pollock	133,739,000	430,060,000		563,799,000
Haddock	57,868,000	68,257,000		126,125,000
Flatfish		809,270,000		809,270,000
Lobster		199,680,000	200	199,680,200
Total	422,275,873	3,421,591,295	19,726,114	3,863,593,282

The distribution of this output necessitated 641,250 miles of travel, 123,394 of which were performed by the Bureau's cars and the remainder by detached messengers. All transportation was paid for with the exception of 12,314 miles of car travel and 81,355 miles by messengers.

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STATIONS OPERATED.

The permanent hatcheries operated in 1913 numbered 34, and the subhatcheries, auxiliaries, and egg-collecting stations numbered 102. These were located in 30 States and Alaska. The hatcheries may be conveniently classified as follows:

Location and character of operations.	Number.
Atlantic rivers, for salmon, shad, striped bass, yellow perch, and white perch	4
Pacific rivers, for salmon and steelhead trout	5
Great Lakes, for whitefish, cisco, lake trout, and pike perch	4
Interior waters, for bass, sunfish, crappie, trout, etc	18
Atlantic coast, for cod, haddock, pollock, flounder, and lobster	3
Total	34

A full list of the hatcheries operated, and the subsidiary stations under each, with the period of operation and the species handled, is here given. The main stations, arranged in alphabetical order, are those for which a superintendent and other employees are provided by law. The subordinate stations, which are sometimes as fully equipped and important as the others, but have no special superintendent and often no permanent personnel whatever, are arranged under their respective head stations.

FISH-CULTURAL STATIONS OPERATED DURING THE FISCAL YEAR 1913.

Designation.	Period of operation.	Species handled.
Afognak, Alaska	Entire year	Blueback and humpback salmon.
Eagle Harbor, Alaska	May 30–June 30	Blueback salmon.
Uganak Lake, Alaska	June 11–June 30	Do.
Baird, Cal	Entire year	Chinook salmon.
Battle Creek, Cal	Oct.–Jan	Do.
Hornbrook, Cal	Oct.–May	Silver salmon and rainbow trout.
Mill Creek, Cal	Oct.–Jan	Chinook salmon.
Baker Lake, Wash	Entire year	Chinook, blueback, and silver salmon and steelhead trout.
Birdsview, Wash	do	Chinook, blueback, silver, dog, and humpback salmon and steelhead trout.
Brinnon, Wash	do	Dog salmon and steelhead trout.
Darrington, Wash	do	Silver, chinook, and dog salmon and steelhead trout.
Duckabush, Wash	do	Chinook, silver, and dog salmon and steelhead trout.
Elwell Creek, Wash	Sept. 11–June 30	Chinook and silver salmon and steelhead trout.
Illabott Creek, Wash	Entire year	Chinook, silver, and dog salmon and steelhead trout.
Quilcene, Wash	do	Silver and dog salmon and steelhead trout.
Battery, Md	May 6–May 25	Yellow perch, shad, and white perch.
Boothbay Harbor, Me	Entire year	Cod, flatfish, haddock, and lobster
Portland, Me	July 1–Nov. 30; May 5–June 30	Lobster.
Bozeman, Mont	Entire year	Brook, black-spotted, rainbow, steelhead, and lake trout and grayling.
O'Dell Creek, Mont	Apr. 1–May 12	Grayling.
Red Rock, Mont	May 1–June 30	Do.
South Meadow Creek, Mont	Apr. 1–June 26	Grayling and rainbow trout.
Yellowstone Park, Wyo	July 1–Sept. 10; June 6–June 30	Black-spotted trout.
Beaver Dam, Wyo	July 23–July 27	Do.
Clear Creek, Wyo	July 5–July 27	Do.
Columbine Creek, Wyo	July 9–July 19	Do.
Cub Creek, Wyo	July 5–Aug. 20	Do.
Lake Camp, Wyo	July 1–Sept. 10; June 6–June 30	Do.
Thumb Camp, Wyo	July 1–Aug. 17; June 12–June 30	Do.
Bryan Point, Md	Feb. 11–May 22	Yellow perch and shad.

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FISH-CULTURAL STATIONS OPERATED DURING THE FISCAL YEAR 1913—Continued.

Designation.	Period of operation.	Species handled.
Cape Vincent, N. Y.	Entire year	Whitefish, cisco, lake, brook, and rainbow trout, pike perch, yellow perch, and landlocked salmon.
Mud Creek, N. Y.	Apr.	Pike perch.
Three Mile Bay, N. Y.	Nov.	Whitefish and cisco.
Clackamas, Oreg.	Entire year	Chinook and silver salmon, brook, rainbow, black-spotted, and steelhead trout.
Applegate Creek, Oreg.	Sept. 10–May 31	Silver salmon and steelhead trout.
Big White Salmon River, Wash.	Aug. 1–Feb. 28	Chinook salmon.
Eagle and Tanner Creeks, Oreg.	Sept. 1–Oct. 31	Do.
Eagle Creek, Oreg.	Apr. 1–June 20	Steelhead trout.
Illinois River, Oreg.	Sept. 1–Jan. 1	Chinook and silver salmon.
Little White Salmon River, Wash.	Entire year	Chinook salmon.
Lower Rogue River, Oreg.	Aug. 15–Mar. 31	Do.
Rogue River, Oreg.	Entire year	Chinook and silver salmon, steelhead and black-spotted trout.
Upper Clackamas River, Oreg.	do	Chinook and silver salmon, and steelhead trout.
Willamette Falls, Oreg.	June 15–July 15	Shad.
Cold Springs, Ga.	Entire year	Large-mouth black bass, sunfish, and catfish.
Harris Pond, Ga.	do	Catfish and sunfish.
Craig Brook, Me.	do	Atlantic, landlocked, and chinook salmon, brook, rainbow, and Scotch sea trout, and hybrids.
Upper Penobscot, Me.	Jan.–June	Atlantic salmon.
Duluth, Minn.	Entire year	Lake, rainbow, brook, and steelhead trout, whitefish, pike perch, and landlocked salmon.
Grand Marais, Minn.	Sept. 25–Dec. 3	Lake trout.
Grand Portage, Minn.	Nov. 5–Dec. 2	Do.
Isle Royale, Mich.	Oct. 14–Nov. 10	Do.
Keweenaw Point, Mich.	Oct. 6–Oct. 22	Do.
Le Claire Point, Minn.	July 1–Oct. 5	Sturgeon.
Little Brule, Minn.	Nov. 11–Dec. 6	Lake trout.
Marquette, Mich.	Oct. 11–Nov. 13	Do.
Munising, Mich.	Oct. 14–Nov. 10	Do.
Ontonagon, Mich.	do	Do.
Edenton, N. C.	Entire year	Shad and black bass.
Weldon, N. C.	Mar. 15–May 15	Striped bass.
Erwin, Tenn.	Entire year	Rainbow and brook trout, large-mouth and small-mouth black bass, rock bass, sunfish, yellow perch, yellow catfish, and carp.
Gloucester, Mass.	do	Cod, pollock, haddock, flatfish, and lobster.
Boston, Mass.	Oct. 11–Nov. 15; Apr. 20–June 30	Lobster.
Portsmouth, N. H.	May 1–June 30	Do.
Rockport, Mass.	Oct. 1–June 30	Lobster, cod, and haddock.
Green Lake, Me.	Entire year	Landlocked salmon, brook trout, lake trout, and smelt.
Grand Lake Stream, Me.	do	Landlocked salmon and brook trout.
Homer, Minn.	do	Rainbow trout, buffalo-fish, catfish, yellow perch, large-mouth and small-mouth black bass, crappie, sunfish, and rock bass.
La Crosse, Wis.	do	Buffalo-fish, catfish, yellow perch, large-mouth and small-mouth black bass, crappie, sunfish, and rock bass.
Leadville, Colo.	do	Brook, rainbow, and black-spotted trout.
Cheesman Lake, Colo.	Apr. 10–May 16	Rainbow trout.
Edith Lake, Colo.	Oct. 15–Nov. 20	Brook trout.
Eldora Lake, Colo.	Oct. 15–Nov. 18	Do.
Engelbrecht Lake, Colo.	Oct. 9–Nov. 16	Do.
Miklick Ponds, Colo.	Nov.	Do.
Musgrove Lakes, Colo.	Oct. 10–Dec. 2	Do.
Seven Lakes, Colo.	June 16–July 15	Black-spotted trout.
Smith Ponds, Colo.	Oct. 26–Dec. 6	Brook trout.
Mammoth Spring, Ark.	Entire year	Small-mouth and large-mouth black bass, crappie, catfish, sunfish, and rock bass.
Friars Point, Miss.	May 5–June 30	Large-mouth black bass, catfish, and sunfish.
Marked Tree, Ark.	July 1–Sept. 10	Large-mouth black bass, crappie, sunfish, catfish, pickerel, and buffalo-fish.

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FISH-CULTURAL STATIONS OPERATED DURING THE FISCAL YEAR 1913—Continued.

Designation.	Period of operation.	Species handled.
Manchester, Iowa	Entire year	Brook and rainbow trout, small-mouth black bass, and rock bass.
Bellevue, Iowa	July 15–Sept. 1; Apr. 1–May 17	Black bass, sunfish, catfish, pike, crappie, and buffalo-fish.
North McGregor, Iowa	July 15–Aug. 1; Apr. 25–May 15	Black bass and catfish.
Nashua, N. H	Entire year	Brook, rainbow, and steelhead trout, chinook salmon, and small-mouth black bass.
Neosho, Mo	do	Rainbow trout, large-mouth and small-mouth black bass, rock bass, crappie, sunfish, and carp.
Northville, Mich	do	Lake, brook, and rainbow trout, small-mouth and large-mouth black bass, crappie, catfish, and yellow perch.
Algonac, Mich	May 1–May 21	Pike perch.
Au Sable, Mich	Nov. 5–Nov. 9	Lake trout.
Bay City, Mich	Mar. 22–May 3	Pike perch and yellow perch.
Belle Isle, Mich	Oct. 24–Dec. 10	Whitefish.
Charity Island, Mich	Oct. 9–Nov. 30	Do.
Charlevoix, Mich	Nov. 5–Nov. 22; Feb. 17–May 10	Lake trout and whitefish.
Cheboygan, Mich	Oct. 18–Nov. 6	Lake trout.
Detour, Mich	Oct. 14–Nov. 9	Do.
Detroit, Mich	Entire year	Whitefish, yellow perch, and pike perch.
Fairport, Mich	Nov. 1–Nov. 20	Lake trout.
Frankfort, Mich	Nov. 6–Nov. 20	Do.
Grand Haven, Mich	Nov. 5–Nov. 20	Do.
Grassy Island, Mich	Oct. 21–Dec. 7	Whitefish.
Great Lake George, Mich	Oct. 17–Nov. 16	Do.
Manistique, Mich	Oct. 23–Nov. 21	Lake trout.
Port Huron, Mich	May 3–May 17	Pike perch.
St. James, Mich	Nov. 1–Nov. 22	Lake trout.
St. Joseph, Mich	Oct. 21–Nov. 20	Do.
Sault Ste. Marie, Mich	Feb. 15–May 15	Whitefish and lake trout.
Put-in Bay, Ohio	Entire year	Whitefish, pike perch, and yellow perch.
Kellys Island, Ohio	Nov. 12–Dec. 4	Whitefish.
Middle Bass, Ohio	Nov. 18–Dec. 4	Do.
Monroe Piers, Mich	Nov. 1–Dec. 8 and Apr	Whitefish and pike perch.
North Bass, Ohio	Nov. 12–Dec. 7; Apr. 17–May 8	Whitefish, pike perch, and yellow perch.
Port Clinton, Ohio	Nov. 10–Dec. 7; Apr. 8–Apr. 29	Whitefish and pike perch.
Toledo, Ohio	Apr. 7–Apr. 30	Pike perch.
Quincy, Ill	Entire year	Large-mouth and small-mouth black bass, rock bass, pike perch, yellow perch, sunfish, catfish, crappie, buffalo-fish, and carp.
St. Johnsbury, Vt	do	Brook, rainbow, and steelhead trout, silver and landlocked salmon, and small-mouth black bass.
Darling Pond, Vt	July 19–Dec. 6	Brook trout.
Holden, Vt	Entire year	Brook and steelhead trout.
Lake Mitchell, Vt	Sept. 4–Nov. 30	Brook trout.
Lake Wantastiquet, Vt	Sept. 16–Dec. 4	Do.
Orleans, Vt	Apr. 16–May 16	Steelhead trout.
Swanton, Vt	Mar. 12–May 23	Pike perch and yellow perch.
San Marcos, Tex	Entire year	Black bass, rock bass, crappie, and sunfish.
Spearfish, S. Dak	do	Brook, Loch Leven, rainbow, black-spotted, lake, and steelhead trout.
Schmidt Lakes, S. Dak	Oct. 20–Dec. 20	Brook trout.
Sand Creek, S. Dak	Oct. 20–Jan. 15	Do.
Tupelo, Miss	Entire year	Large-mouth black bass, rock bass, sunfish, warmouth bass, crappie, catfish, and yellow perch.
Rosedale, Miss	July–Dec	Large-mouth black bass, rock bass, yellow bass, crappie, sunfish, catfish, and white bass.
White Sulphur Springs, W. Va	Entire year	Brook, rainbow, and blackspotted trout, small-mouth and large-mouth black bass.
Woods Hole, Mass	do	Cod and flatfish.
Noank, Conn	Mar. 8–Mar. 25	Flatfish.
Plymouth, Mass	Nov. 19–Mar. 25	Cod.
Sagamore, Mass	do	Do.
Waquoit, Mass	Jan. 13–Mar. 25	Flatfish.
Wickford, R. I	Feb. 19–Mar. 25	Do.
Wytheville, Va	Entire year	Brook and rainbow trout, large-mouth and small-mouth black bass, rock bass, and sunfish.
Yes Bay, Alaska	do	Blueback salmon.

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FISH-CULTURAL RELATIONS WITH THE STATES AND WITH FOREIGN COUNTRIES.

The Bureau has continued and extended its cooperative relations with the State fishery authorities, and in 1913 allotted large numbers of eggs to be hatched under State auspices and considerable numbers of young fish, for planting in local waters. The States which requested this kind of aid from the Bureau number 25 and include nearly all that are engaged in practical fish culture. A list of the States, and the allotments to each, is shown in the following table:

ALLOTMENTS OF FISH AND FISH EGGS TO STATE FISH COMMISSIONS IN THE FISCAL YEAR 1913.

State and species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
California:			
Brook trout	150,000		
Chinook salmon	16,942,873		
Grayling	50,000		
Landlocked salmon	10,000		
Colorado: Blackspotted trout	2,000,000		
Connecticut:			
Brook trout	25,000		
Lake trout	50,000		
Yellow perch	5,000,000		
Delaware: Black bass			150
Georgia:			
Black bass			2,500
Sunfish			700
Idaho: Brook trout			1,650
Maine:			
Brook trout	100,000		
Landlocked salmon	100,000		
Maryland: Black bass			600
Massachusetts:			
Catfish			300
Chinook salmon	50,000		
Pike perch	4,000,000		
White perch	15,000,000		
Yellow perch	5,000,000		
Michigan:			
Grayling	50,000		
Lake trout	3,000,000		
Pike perch	41,700,000		
Yellow perch		3,500,000	
Minnesota:			
Lake trout	500,000		
Landlocked salmon	10,000		
Steelhead trout	100,000		
Missouri: Rainbow trout			37,800
Montana:			
Blackspotted trout	2,038,500		
Brook trout	200,000		
Grayling	588,000		
Rainbow trout	50,000		
Whitefish	3,000,000		
Nevada:			
Brook trout	50,000		
Rainbow trout	50,000		
Silver salmon	100,000		
New Hampshire:			
Chinook salmon			7,900
Steelhead trout	75,000		
New Jersey:			
Landlocked salmon	8,000		
Rainbow trout	50,000		
Steelhead trout	100,000		
White perch		2,000,000	
Yellow perch		2,000,000	
North Dakota: Steelhead trout	200,000		
Ohio: Whitefish	19,280,000		
Oregon:			
Blackspotted trout	625,000		
Blueback salmon	2,000,000		
Brook trout	300,000		
Chinook salmon	21,491,000		
Rainbow trout	380,000		

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ALLOTMENTS OF FISH AND FISH EGGS TO STATE FISH COMMISSIONS IN THE FISCAL YEAR 1913—Continued.

State and species.	Eggs.	Fry.	Fingerlings, yearlings, and adults.
Pennsylvania:			
Lake trout	100,000		
Whitefish	40,920,000		
Utah:			
Brook trout			12,000
Catfish			72
Small-mouth black bass			160
Vermont:			
Brook trout		50,000	
Lake trout	150,000		
Landlocked salmon	10,000		
Steelhead trout	30,000		
Washington:			
Blackspotted trout	400,000		
Steelhead trout	200,000		
Wisconsin:			
Lake trout	2,500,000		
Whitefish	5,000,000		
Wyoming:			
Black bass			60
Blackspotted trout	2,200,000		
Brook trout	225,000		560
Grayling	50,000		
Lake trout	50,000		2,000
Rainbow trout	148,000		
Steelhead trout	100,000		
Total	196,506,373	7,550,000	66,452

In response to requests coming through diplomatic channels, in return for courtesies received, the Bureau furnished the following numbers of eyed eggs to the authorities of the countries indicated:

SHIPMENT OF EGGS TO FOREIGN COUNTRIES DURING THE FISCAL YEAR 1913.

Country.	Species.	Number.
British Columbia	Whitefish	5,000,000
Canada	Brook trout	150,000
	Steelhead trout	100,000
Germany	Rainbow trout	100,000
India	do	10,000
Japan	do	250,000
Total		5,610,000

REVIEW OF FISH-CULTURAL OPERATIONS.

Pacific coast and Alaska stations.—No improvement has occurred in the conditions which have prevailed for some years in the Sacramento River and tributaries, resulting in a general decline of the salmon runs, and a relative falling off in the output of the Bureau's California stations. A large run of salmon was reported in the Sacramento River in the fall of 1912, but owing to extremely low water during the spawning season comparatively few of the fish were able to enter the tributaries on which the hatcheries are located. Later on, unusually heavy freshets partly wrecked the retaining racks and permitted the impounded fish to escape. An attempt was made late in the fall to secure eggs from commercial fishermen operating in the Sacramento River, near Tehama, Cal., but no ripe fish were

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found, and the fishermen abandoned the work early on account of the low market value of their catch. The entire collection of chinook salmon eggs for the Baird, Battle Creek, and Mill Creek stations amounted to 20,111,800. Low-water stages also existed throughout the season in Cottonwood Creek, at Hornbrook, Cal., and in the Klamath River, at Klamathon, Cal., reducing the collections of rainbow trout and silver salmon eggs at these points below those of the preceding year.

Increased efforts and the generally favorable climatic conditions prevailing in Oregon resulted in substantial gains in the output of fish from the stations in that State. There was an unusually heavy run of chinook salmon in the Columbia River and tributaries, continuing from early in September until late in the fall. On the Little White Salmon River 30,595,000 eggs were secured, filling the hatchery to its capacity and necessitating the transfer of large numbers of eggs to other stations to relieve the congested condition. The collections at the Big White Salmon station were supplemented by eggs derived from brood fish purchased of trap fishermen operating in the Columbia River, the fish thus obtained being towed to the station and held in a small stream on the reservation for the ripening of their eggs. The output of salmon fry at the two Columbia River stations was the largest in their history. The egg collections on the Little White Salmon exceeded those of any previous year by 12,000,000, and when the work was discontinued on October 7, owing to lack of hatching facilities, ripe salmon were still available.

The same conditions governing the run of salmon in the Columbia River existed in other streams in Oregon, and resulted in an increased output of silver salmon and steelhead trout. The Cazadero field station, on the upper Clackamas River, having been cut off from the free passage of fish by the recent construction of an 80-foot dam, a new site for the conduct of operations was selected at a point on the river 30 miles distant from Portland, the land for the purpose and the water supply for the hatchery being donated to the Bureau by the Portland Railway, Light & Power Co.

The year's fish-cultural operations at Baker Lake and auxiliary stations, in Washington, were attended with gratifying results, the output of chinook, blueback, silver and dog salmons, and steelhead trout being substantially larger than in either of the two previous years. The total egg collections of all species numbered 46,330,500, as compared with an aggregate of 23,535,800 in 1912, and the output of fry was correspondingly increased. At the other Puget Sound stations there was a slight falling off in the output of silver salmon, owing to the destruction of the retaining racks by freshets during the spawning season, but the losses were more than offset by the collections at two new field stations established and operated for the first time on Elwell Creek, near Sultan, and on the Sauk River, near Darrington. A new station was also operated on the Dusenwallops River, a tributary of Hood Canal, Puget Sound, near Brinnon, Wash., where 8,360,000 dog salmon eggs were gathered. The work of the Baker Lake station, which is located in an almost inaccessible region on Baker Lake, at the foot of Mount Baker, was greatly facilitated by the establishment of a telephone line connecting the station with Concrete, Wash., the nearest railroad station, 18 miles distant. The

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Birdsview station, on the Skagit River, was improved by the erection of new hatchery and other buildings.

The eruption of Katmai Volcano, on the Alaska peninsula, June 6, 1912, covered the island of Afognak with volcanic ash and sand to an average depth of 9 inches. It is estimated that 20,000 salmon perished at the head of Litnik Lake, while thousands ascending tributary streams during the spawning season in July were driven back into the ocean. These conditions curtailed the work of the Afognak station, the total output for the year 1913 amounting to 12,551,102 blueback and 151,800 humpback salmon fry. Owing to the accumulation of volcanic ash in the hatching troughs, great difficulty was experienced in holding the comparatively small number of eggs collected, and heavy losses of both eggs and fry resulted through suffocation. In May, 1913, two temporary field stations were located in connection with the Afognak station—one on a small stream tributary to Eagle Harbor and one at Uganak Lake, Kodiak Island. Racks were constructed and the salmon runs were investigated with the view of ascertaining if the conditions warrant the establishment of permanent stations in these fields.

At the Yes Bay, Alaska, station there was a slight shortage in the collection of blueback salmon eggs, owing to low-water stages early in the season, followed later by heavy rains and freshets, which partly destroyed the retaining racks and allowed the escape of several thousand ripe fish. During the early part of the season the eggs collected were of poor quality, owing, it is supposed, to the low water which caused the fish to remain in the lake too long after their eggs matured. The eggs improved in quality as the season advanced, the operations resulting in a total yield of 66,125,000, a shortage of 5,875,000 as compared with the take of last year. Many improvements were made to the buildings and apparatus during the year, the most important of which was the installation and operation of 160 additional hatching troughs.

The condition of the salmon fisheries of the Pacific coast warrants continuous and systematic investigation and makes imperative the greatest possible exertions on the part of the Bureau to propagate the various salmons on a more extensive scale and to distribute the young fish in a manner which will insure the largest results. The superintendent of the California stations reports that a large percentage of the young salmon liberated in the Sacramento River perish on the lowlands, because of irrigating ditches and overflows or easements of the river. The subject has been forcefully treated in various reports from the Bureau's representatives and demands the serious attention of the State authorities. Another feature of the salmon situation in California which may necessitate a complete change in the method of planting is the enormous destruction caused by trout and other predaceous fishes while the young are on their way to the sea.

Better conditions obtain in the States of Oregon and Washington. The irrigation of arid lands is not practiced so extensively as in California, and most of the hatcheries are located nearer tidewater, thereby lessening the loss of young salmon by attacks of predaceous fishes during passage to the sea. Extensive field operations were conducted in Oregon and Washington during 1913, and plans have

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been made for still greater expansion of the work during the next fiscal year. In the Columbia basin, investigations are now being made, with the view of establishing a station at Swan Falls, Idaho, for the propagation of the early run of chinook salmon.

The results this year at the Quilcene and Duckabush stations, which were operated for the first time in 1912, indicate that the establishment of inexpensive egg-collecting camps on streams tributary to Hood Canal will result in good returns of silver and dog salmon. An additional station on the Sauk River, at Darrington, Wash., plans for which are now being drawn, will add materially to the output of salmon from the Washington stations.

In view of the accepted belief that the salmon fisheries can be more effectively aided and maintained through the liberation of fingerling fish, arrangements have been made to increase the facilities at all the Pacific coast stations, including those in Alaska, for the purpose of rearing a larger number of salmon fry to the fingerling stage than ever before.

Commercial fishes of the Great Lakes.—The extensive and long-continued operations of the Bureau in the Great Lakes are addressed to the lake trout, whitefish, cisco or lake herring, and pike perch. In addition to the stations belonging to the Government, several hatcheries, abandoned by the State of Michigan for a number of years because of the discontinuance of work of this character, were leased by the Bureau and operated with temporary personnel.

The most important fish-cultural work of the Duluth, Minn., station—the maintenance of the lake trout fisheries of Lake Superior—was slightly interfered with by storms occurring at the height of the spawning season, which not only reduced the egg collections considerably below what had been anticipated, but also impaired to some extent the quality of the eggs secured. The spawning season in the various fields of this lake extended from September 25 to December 6, and resulted in the collection of 10,035,000 eggs, which stock was augmented by the transfer of 5,000,000 green eggs from the Manistique field, a subsidiary of the Northville station. The output of lake trout from Duluth consisted of 1,260,000 eyed eggs, for the stocking of various Government, State, and private hatcheries, and 6,825,000 fry and fingerling fish, for liberation on the spawning grounds in Lake Superior. Additional transfers of eggs of commercial species from other stations to Duluth comprised 20,000,000 whitefish eggs from Put-in Bay station and 25,000,000 pike-perch eggs from Detroit, which were hatched and distributed with only normal losses, the whitefish being deposited in Lake Superior and the pike perch utilized in filling applications for the stocking of various inland lakes in Minnesota and adjacent States.

In the fields operated from the Michigan stations the spawning season of the lake trout opened October 21, a week later than usual, and was just at its height at the beginning of the close season on November 20, when under the State law it became necessary to suspend operations. The collections of eggs at all points numbered 53,907,500, and had the open season been extended a week it is estimated that many million more eggs might have been secured. Approximately 14,000,000 eggs were utilized in stocking various Government and State hatcheries, and 13,500,000 fry were hatched and returned to the spawning grounds in Lakes Michigan and Huron. The

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whitefish spawning season in Michigan waters extended over a period of two months from October 9, the largest egg collections being obtained from the Detroit River fields, where fishing was conducted under the auspices of the State game, fish, and forestry warden's department. Extensive collections of eggs were made also at Charity Island, in Saginaw Bay, the brood fish being secured from pound nets operated by a fisherman under a special contract. Work in this field was brought to a sudden close at the height of the season by a disastrous windstorm, which put every net out of commission.

An experimental whitefish collecting station, operated for the first time in the American waters of upper Lake St. George, gave unsatisfactory results, as most of the fish were taken illegally by natives in the vicinity. The work of collecting pike-perch eggs for the Detroit hatchery was conducted from April 9 to May 21 in Saginaw Bay and the Canadian waters of the St. Clair River, 216,550,000 being obtained from fields which had yielded only 21,000,000 eggs in the spring of 1912.

The whitefish spawning season in Lake Erie, extending from November 12 to December 10, was not interfered with to any extent by storms, and the work accomplished was the most successful in the history of the Put-in Bay station, 350,080,000 eggs of good quality being secured from fields which yielded only 82,000,000 in 1912. An encouraging feature of the work was the interest displayed in it by many of the commercial fishermen, to whose assistance a considerable measure of the success may be attributed. Approximately 111,000,000 of the eggs secured were transferred in the green or eyed state to Government and State hatcheries, and 197,300,000 strong, healthy fry were hatched from the remainder and liberated in Lake Erie. The pike-perch work, on the other hand, proved very disappointing, especially in view of the encouraging prospects early in the spring, when brood fish were on the spawning grounds in the lake in large numbers. The prevalence of violent winds prevented the installation of the fishermen's nets for a month beyond the usual time, and before they could be operated to any extent most of the fishes had been driven from the grounds by the immense quantities of mud and filth discharged into the lake as a result of one of the heaviest floods ever experienced. The entire crop of eggs, amounting to 133,500,000, was developed at the Put-in Bay station, and the 46,500,000 fry produced were returned to the lake, no shipments of either eggs or fry being sent to other hatcheries.

No cisco work was attempted by the Bureau in Lake Erie, as arrangements for covering all available territory for the collection of eggs of that species had been made by the Ohio Fish Commission. The propagation of yellow perch and sauger, instituted in connection with the work of the Put-in Bay station in the spring of 1912, was again undertaken, but with poor results. Saugers for some unknown reason were very scarce, and the few eggs secured proved worthless, while the muddy condition of the water supply interfered with the hatching of the yellow-perch eggs to such an extent that only 3,000,000 fry were produced from the 8,064,000 eggs collected.

In Lake Ontario the newly developed fields for the collection of eggs of the whitefish, cisco, lake trout, and pike perch were operated during the respective spawning seasons. Three-Mile Bay and waters in the immediate vicinity of the Cape Vincent station yielded 1,160,000

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whitefish and 5,350,000 cisco eggs; 144,160 lake-trout eggs were secured from the Pigeon Island fishery, while 3,937,500 pike-perch eggs of fair quality were obtained in Mud Creek. Far more satisfactory results might have been accomplished in all these fields had not the work been hampered during the entire period of operations by the unfavorable weather and water conditions prevailing. These eggs, together with 40,750,000 eggs of whitefish, lake trout, and pike perch transferred from other stations, were successfully hatched and distributed, most of the fry being liberated in Lake Ontario.

The collections of pike-perch eggs for the Swanton, Vt., station were only about half as large as those of the preceding year, the comparative failure being partially due to the scarcity of female fish on the spawning grounds. Male fish were there in great abundance, and later in the season a consignment of green females was tranferred from the Canadian fishing grounds in the north end of Missisquoi Bay and placed in a rude inclosure which had been provided for them in Lake Champlain, in the vicinity of the field of operations. They were held in good condition so long as a sufficient depth of water could be maintained in the inclosure, but before their eggs had matured in considerable numbers the water in the lake receded and became so warm that, in order to prevent the total loss of the impounded fish, the bulk of them were liberated before they had ripened.

With the view of being nearer the fishing grounds, and also in order that the Bureau might conduct its operations independently of the various persons controlling the river shores heretofore occupied, steps were taken in advance of the spawning season to establish a collecting and penning station on Lake Champlain, at Sandy Point, and while the outcome of the operations was not as favorable as had been anticipated it is believed the change in location prevented what would have otherwise been an almost complete failure, and that the difficulties encountered this season may be largely overcome another year by providing more suitable impounding facilities. The collections numbered 111,037,500, and the output of fry was 58,280,000. In connection with the pike-perch work, 23,300,000 eggs of the yellow perch were secured, 11,000,000 of which were utilized in filling applications from State fish commissions. The remainder were hatched and the fry returned to the spawning grounds.

Reports as to the abundance of the Lake Champlain whitefish in the vicinity of the Swanton station having led to the belief that there was a possibility of satisfactory results in the artificial propagation of this species, steps were taken during the fall of 1912 to impound brood fish in the inclosure at Sandy Point. In the three days immediately preceding the opening of the fishing season several hundred brood fish were captured and penned, and throughout the open season all the seines within reach of the station were regularly visited by spawn takers, but in no instance was a ripe female secured. From the experience gained the conclusion has been reached that the spawning of the Lake Champlain whitefish occurs after the formation of ice in the lake, at a time when spawn-taking operations could not be successfully conducted.

The marine stations.—The Boothbay Harbor station, in cooperation with the fishery authorities of the State of Maine, collected during the year 16,965 egg-bearing lobsters, constituting the largest brood stock ever secured for the pound established in connection with that

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station. This stock was carried through the winter with only nominal losses, but the egg collections fell behind those of the preceding year, owing partly to the smaller average size of the lobsters and partly to the unusually large percentage of barren ones. This latter condition was brought about, it is believed, by the abnormally mild winter, which caused many of the lobsters to lose their eggs in the pound. The impounded lobsters yielded 161,064,000 eggs, an average of 12,122 per lobster. The loss on the eggs during incubation was insignificant, and the resulting fry were liberated in excellent condition.

An unusually large body of haddock made its appearance on the Maine coast near the Boothbay Harbor station about the middle of April and afforded excellent fishing for a month. During this period approximately 100,000,000 eggs were secured from the gill-net fishermen and transferred to the station, but the losses during incubation—always heavy on eggs of this species—reduced the stock to such an extent that only 22,967,000 fry were produced.

In marked contrast to the abundance of haddock was the great scarcity of flatfish during the spawning season, not only in fields contiguous to the Boothbay Harbor station, but in all waters along the Maine coast where they are usually found. The diligent operation of fyke nets at all likely points within reach of the station throughout the spawning season, extending from February 25 to the last week in April, resulted in a collection of only 4,007 breeders. Part of this stock was allowed to spawn naturally in the retaining tables, in accordance with past custom, but, owing to lack of room, many of the fish were stripped and the eggs fertilized artificially. The 452,386,000 eggs obtained produced 413,961,000 fry, the loss in hatching amounting to only about 9 per cent, as compared with 12 per cent the preceding year. There appears to be a growing sentiment in favor of the flatfish among the commercial fishermen of Maine, and it is believed the time is approaching when the Bureau will not be compelled, as at present, to rely solely on its own efforts in obtaining brood fish of this species.

Owing to the nonappearance of the usual inshore run of cod along the Maine coast the efforts of the Bureau to secure eggs in Casco Bay and at Cape Elizabeth proved nearly futile. A small run of fish appeared during the spring in the immediate vicinity of the Boothbay Harbor station, and had fishing operations in these waters been conducted with gill nets there is reason to believe that considerable collections of eggs might have been made. Equipped as the fishermen were, however, with short trawl lines, they met with poor results. The egg collections from all points amounted to 9,089,000 and the fry distributed numbered 5,611,000.

The year's work at the Gloucester station involved the handling of 1,431,588,000 eggs of four species of marine fishes and the lobster and the distribution of 825,050,000 fry hatched therefrom. Fish-cultural operations were continued uninterruptedly from November 1 to the close of the fiscal year, and at many times during this period eggs of the various species were received in such quantities that it was impossible to handle them all with the limited facilities available. The surplus eggs were transferred to the Woods Hole station when practicable, but plants of eggs of pollock, cod, and haddock aggregat-

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ing 198,407,000 were made in the harbor off Gloucester, owing to the lack of hatching facilities at either station.

During the pollock spawning season, extending from November 1 to the end of January, 856,680,000 eggs were collected from fish taken by a fleet of gill-net steamers, and 430,060,000 fry of good quality were hatched and distributed on the natural spawning grounds off Cape Ann.

Eggs of the cod in considerable numbers began coming in immediately after the close of the pollock season, and with the exception of four days, lots were received daily from February 16 to April 7, the total collections amounting to 170,840,000. This noteworthy record is attributed to the mild weather prevailing throughout the spawning period. The eggs were generally of good quality, and in addition to the transfer of 13,096,000, owing to the crowded condition of the hatchery, 105,150,000 fry were produced for distribution along the Massachusetts coast.

Haddock eggs to the number of 135,800,000 were received between March 17 and April 15, at a time when the hatchery was so crowded that only about half of them could be handled with the apparatus available. The 77,932,000 eggs retained yielded 45,290,000 fry.

On account of inability to obtain brood fish in the usual numbers, the results of the flatfish work were only two-thirds as large as in the previous season. The 580 brood fish handled yielded 253,365,000 eggs, from which 230,070,000 fry were hatched and distributed. Early in the season these eggs were handled in Chester jars, but later, when all jars were needed for the cod and haddock eggs, the flatfish eggs were placed in scrim-covered floating boxes, made of 2 by 3 inch spruce, 5 feet long, 3 feet wide, and 2 feet deep, from 40,000,000 to 50,000,000 eggs to the box, and development proceeded fully as well as in the jars.

On May 1 the lobsters which had been carried through the winter in the compartment live-car at the Gloucester station were removed to the hatchery and stripped, 453 survivors of the 636 lobsters originally placed in the car yielding 4,811,000 eggs. The spring collection of lobsters for the Gloucester station was the poorest in years, only 543 breeders being secured. These yielded 8,767,000 eggs, giving a total of 13,578,000 for the season. At the close of the year 3,000,000 of these eggs were still in process of hatching.

The work of the Woods Hole station was confined principally to the propagation of cod and flatfish. In November a brood stock of cod was purchased from commercial fishermen and placed in the pool and live-cars to ripen. On November 20 the first consignment of cod eggs was received from the steamer *Phalarope*, operating in the field near Sagamore, Mass., and fair collections were received from that source until Christmas time, when for some reason the fish left the spawning grounds. Slightly more than 45,000,000 eggs were received from the field, and these, added to the yield of the brood stock, gave a total of 216,794,000, from which 110,251,000 fry were hatched and distributed.

Contrary to the conditions experienced at the other marine stations, flatfish were found in abundance in the territory surrounding the Woods Hole station, and the prospects early in the season seemed very promising. It soon transpired, however, that the mild weather, to which was attributed the plentiful supply of brood fish, was having

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a very detrimental effect upon the eggs, which in the majority of cases failed to develop, the season's collections of 541,114,000 producing only 165,239,000 fry. No lobster work was undertaken at the Woods Hole station the past season, as previous experience had shown that the supply of brood lobsters available on the southern Massachusetts coast was not sufficient to warrant the expense of collecting them. Efforts in this direction will therefore be confined for the present to the Gloucester station.

Anadromous fishes of the Atlantic coastal streams.—The fish-cultural season on the Susquehanna River was marked by peculiar conditions, high winds and correspondingly high or low tides being prevalent most of the time and interfering greatly with the operations of the fishermen. Yellow-perch eggs were received at Battery station daily from March 17 to March 22, when a heavy southwest storm arose, accompanied by rising temperature, and before its subsidence the spawning season of yellow perch had ended. The egg collections amounted to 286,325,000, and the output of fry to 229,060,000. Collections of white-perch eggs were begun April 8 and discontinued May 20, the 573,000,000 obtained yielding 372,450,000 fry, in addition to 20,000,000 eyed eggs shipped to applicants.

The collections of shad eggs for the Battery station extended from April 19 to May 20 and numbered only 6,861,000, as compared with a take of 12,175,000 in 1912. In addition to the growing scarcity of shad in this river, a most discouraging feature of the shad work is the constantly increasing number of set nets operated by commercial fishermen. The use of these permits destruction by eels of most of the eggs contained in fish taken, owing to the time that elapses between the capture and the tending of the nets.

On the Potomac River some difficulty was experienced in the yellow-perch work by the mild open winter, which permitted extended operations by the commercial fishermen and depleted the supply of brood fish to such an extent that it was impossible to secure a sufficiently large stock of breeders to fill the Bryan Point hatchery with eggs. The collections were made between February 21 and March 14, and resulted in obtaining 10,301 brood fish, about half the number desired. The spawning of these fish was completed by March 24, the total yield of eggs amounting to 124,800,000, an average of 12,115 per fish. A consignment of 3,900,000 eyed eggs was transferred to Central station, and the remaining stock produced 113,923,000 healthy fry, which were distributed in the tributaries of the Potomac River from Broad Creek, Md., to Occoquan Creek, Va.

A new feature of the shad work on the Potomac River was the conversion of a large scow into an auxiliary hatchery, capable of carrying 3,000,000 eggs, by installing thereon a table of 32 McDonald jars and a gasoline pumping plant of a capacity of 2,000 gallons per minute. The water for this hatchery was pumped into a 50-gallon barrel elevated 3 feet above the hatching table, and the connections were arranged for a gravity flow of water to the jars. The scow, thus fitted up and provided with a force of two experienced shad culturists, was moored in Occoquan Bay, Va., for the purpose of promptly and properly caring for all eggs that might be secured within a 24-hour period from the gill-net fishermen operating in that vicinity, such collections being transferred to the main hatchery

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every night by the steamer *Phalarope*. The provision of this subsidiary hatchery will be the means of saving large numbers of eggs that would otherwise be lost through failure to give them attention as soon as taken, the location in question being too far distant from the Bryan Point hatchery to permit of frequent transfers of eggs by messenger.

The shad spawning season opened April 12 and extended to May 17, by which time the shad run had ceased. The egg collections, amounting to 30,919,000, produced 28,428,000 excellent fry, which were carefully distributed over the spawning grounds in the Potomac River. The high percentage of hatch was due to the holding of all eggs delivered at the station for 48 hours before measuring them, and returns to the fishermen were made on the basis of that measurement.

In Albemarle Sound and the contiguous waters seaward, shad were more plentiful than for many years. The mild winter caused spawning fish to make their appearance in the sections operated from the Edenton station somewhat earlier than usual, the first eggs being secured March 20. Five days later the receipts of eggs at the station had become so enormous as to tax the hatching facilities, and shortly afterward the superintendent was compelled to discontinue collections for several days to relieve the congested condition. In the course of the spawning season, which lasted 46 days, there were three additional periods when eggs came in faster than they could be cared for, and on this account many eggs were lost. The season's collections amounted to 138,912,000, and had it not been for the limited hatching facilities they might have been at least 30 per cent greater. The output of fry amounted to 92,522,000, an increase of 20 per cent over that of the preceding year.

The propagation of white perch at the Edenton station having been decided on, three trips were made during March by spawn takers, with collecting outfit, to the spawning grounds of the species, about 20 miles below the station in Albemarle Sound. Practically no fish were secured, and from the information gained it was concluded that the spawning season would not occur until sometime in April, at which time the station force was fully occupied with the shad work. An attempt to propagate the hickory shad at the Edenton station also proved futile, owing to inability to secure the cooperation of the commercial fishermen.

In advance of the spawning season of the striped bass on the Roanoke River it became necessary to renew the hatchery and boiler house, the old plant having been carried away during a 45-foot rise in the river in March. The new hatchery, consisting of a 48 by 16 foot floor built on elevated timbers, and securely wired and anchored to the ground, with the view of resisting future floods, was completed and ready for the reception of eggs by the opening of the spawning season, April 25. The ideal fishing conditions—a series of small swells in the river, serving to keep the water roily so that the fish can not see and avoid the nets—were entirely absent during the season. No rise of any consequence occurred after April 12, and while striped bass in unusual numbers were in evidence, the returns to the commercial fishermen were the smallest ever known. Notwithstanding the unfavorable weather conditions, more eggs were secured than last year, and the output of fry was greater than in any previous season.

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The comparative success is attributable in some measure to the proportionately larger number of ripe males secured, and also to the fact that more females in spawning condition were available than heretofore, both these propitious features being made possible by the very conditions which militated against successful fishing operations. Male and female fish, clustered together in the act of spawning, were easily distinguishable in the clear water of the river, and owing to its low stage it was comparatively easy to surround with a net and capture fish so clustered. By means of the motor launch recently provided for the work on this river, the eggs were collected from the commercial fishermen with greater facility than ever before, and to this fact may be attributed the higher percentage of hatch attained. The egg collections numbered 10,383,000, and the output of fry aggregated 7,234,000.

Propagation of the trouts and pond fishes.—At the trout stations of the Bureau the work in general was similar to that of preceding years. The supply of brook-trout eggs derived from brood fish carried in ponds and collected from wild stock was supplemented by the purchase of eggs from commercial dealers, this course having proved more economical for some stations than the collection of eggs from waters available for the purpose. The total output of fry and fingerling trout exceeded that of last year. Owing to unfavorable weather conditions during the spawning season, fewer rainbow trout were produced than in 1912, the falling off in this branch of the work being more noticeable in Colorado than elsewhere.

In the Yellowstone National Park the provision of additional facilities, the establishment of new field stations, and the extension of operations over a wider territory permitted the collection of approximately 29,000,000 blackspotted trout eggs, more than the number secured in that field in any previous year. The fish-cultural possibilities of Yellowstone Lake and tributary streams are practically unlimited and plans will be made another year to increase still further the output of blackspotted trout from this field, which at the present time is the Bureau's only source of supply for eggs of *Salmo lewisi*, one of the most important species of trout.

A new branch of fish culture undertaken in connection with the work of the St. Johnsbury station was the propagation of steelhead trout in streams tributary to Lake Memphremagog. By means of a trap installed in the Willoughby River, brood fish were intercepted and penned in a spring-fed stream entering the river just above the trap. Operations at this point extended from April 16 to May 16 and resulted in the collection of 176,305 eggs, which were taken by the trap attendant from time to time as the fish ripened, and transferred in fruit jars by express to the St. Johnsbury station. From the experience gained it is believed this will prove a valuable source for egg collections of that species. It was noted that the eggs and fry were much smaller than those of the steelhead trout of the Pacific coast, resembling more closely the eggs and fry of the domesticated rainbow trout. The propagation of steelhead trout from eggs derived from tributaries of Lake Superior, inaugurated in the spring of 1912, could not be resumed the past season, as the waters during the spawning period were too high to permit of successful seining operations. Work in this direction at the Duluth station was therefore limited to the hatching of 50,000 eggs transferred from the

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Pacific coast, the resulting fry being liberated in June in the streams where this excellent species has established itself.

In connection with the acclimatization of the steelhead trout in the Great Lakes region, reference to which has been made in previous reports, the following information from a Wisconsin correspondent is of interest:

About 1906 several pound-net fishermen in the vicinity of Sheboygan and Port Washington, Wis., caught from 100 to 300 steelhead trout, averaging about 1 pound in weight, most of them being returned to the water. Within the next few years these fish increased in numbers and in size, and at the present time they form an important item in the shipments of all pound-net fishermen on Lake Michigan. In 1912 figures obtained from fishermen between Port Washington and Sheboygan showed the catch for that year to be in the neighborhood of 7,000 and 8,000 pounds, and the catch for 1913 promises to be heavier. The largest specimens taken in the vicinity weighed 22 pounds, but the average weight is 7 pounds. Compared with the lake trout the steelheads have less entrails, are more game, and are found nearer the shore. Many have been caught going upstream. About two-thirds of those caught are spawners, some of them being so weak at spawning time as to be easily caught, giving the impression that they die after spawning. Most of the fish are taken in pound nets and trap nets, in from 1 to 12 fathoms of water. They are not as good "leaders" as lake trout, and will often gill themselves in the nets, or jump high into the air in an effort to escape. The meat of the steelhead resembles very much that of the Pacific coast salmon, except that it is not quite so red. The market price is the same as for the lake trout. Its food consists of lake chubs and lake herring, of which there is such an abundant supply as to be no hindrance to the future increase of these fish.

The experience with the Scotch sea trout at the Craig Brook, Me., station has demonstrated that the species is worthy of extended efforts to propagate and disseminate it. There are now on hand at that station 16 lots of these fish, ranging from fry to specimens 6 years old, all of which originated from one lot of eggs shipped from England in 1891. They have succeeded excellently in the fresh water of the station and have been found to be almost immune to attacks of the troublesome thyroid disease.

In the spring of 1913 a very promising field for the collection of grayling and rainbow trout eggs was opened in Madison Valley, Mont., and operated as an auxiliary of the Bozeman station. During the spawning season, extending through the month of April and the first half of May, 2,445,800 grayling eggs and about 260,000 rainbow-trout eggs were secured near the towns of Ennis and McAllister, Mont. If the conditions for the propagation of grayling in this field prove as favorable as the prospects now indicate, it is the intention to abandon the old grayling station at Red Rock, Mont., which, owing to its almost inaccessible location, is very expensive to operate.

The propagation of the blackspotted trout at Derby Dam, on the Truckee River, was not undertaken the past season, in view of the small numbers of trout ascending to the dam as a consequence of the great diversion of water from the river for agricultural purposes. The work on this river will not be resumed until a more favorable location for a field station can be found.

Taken as a whole the work at the pond stations during the year was satisfactory, the increase in the output of the black basses, sunfishes, and catfishes being due to the adoption of improved methods, and a more comprehensive knowledge of the factors governing the successful propagation of these fishes. While sudden changes in water temperature during the spawning season at some of the northern and western stations curtailed the work somewhat, the output of the southern stations was materially increased over that of last year.

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Rescue of food fishes from overflowed waters.—This is regarded as one of the most important and immediately effective branches of the Bureau's work in the conservation of fishery resources, as it means the saving of hundreds of thousands of valuable food fishes which would otherwise be lost.

On the Mississippi and Illinois Rivers there was varying success in the different fields. Protracted drought and consequent low-water stages interfered with the work on the upper and lower Mississippi River, but operations were conducted under more favorable auspices on the Illinois River, and nearly half a million black bass, crappie, sunfish, catfish, and other river species were rescued from the sloughs and bayous which had been cut off from the main river, and utilized for stocking inland lakes and streams. In addition to this output many thousands of fish taken from waters where they would ultimately have perished from drought or cold were liberated in the main river.

Miscellaneous fish-cultural notes.—The season's operations with the buffalo-fish at Manchester and auxiliary stations were somewhat disappointing, owing to the great difficulty in obtaining ripe fish, and the heavy mortality of the eggs secured, as a result of the low-water temperatures prevailing during most of the spawning season. The experience of the past two years' operations had led to the conclusion that the spawning of the buffalofish would begin at a water temperature of about 60 degrees, which had occurred during those years about April 25. This year, however, the first spawn was taken on April 18, in a water temperature of 52 degrees, and some eggs were taken each day afterward up to and including April 26, when the water temperature reached 59 degrees. The great irregularity in the development of the brood fish—some days all of them being hard and on others all spent—made it impracticable to send out spawn-takers with the seine boats, and the best that could be done was to meet incoming boats and look over the catch. The 23 fish spawned yielded 5,046,000 eggs, only 80,000 of which hatched. All lots of eggs that were an entire loss died within 48 hours after being taken, large air bubbles collecting on them and causing them to float out of the jars.

At the North McGregor station six ripe fish yielded 500,000 eggs. These were held in a floating box in a water temperature of 60 degrees, in the hope that enough additional eggs could be obtained to warrant their transfer to the Manchester station. The lot looked well up to the seventh day, but eventually the eggs became coated with sediment and all were lost.

The experience thus far gained seems to demonstrate the necessity of warmer water than that available at either Manchester or its substations, and the only apparent way of overcoming the difficulty would be the installation at one of the stations of a small pumping plant, with settling tank and filter, which, in view of the expense involved, seems hardly justifiable.

Evidence of the good results of the present efforts in the artificial propagation and the protection of the lobster appears from the fact that the lobster fishermen along the Maine coast last year had a very successful and remunerative season. Numerous reports have been received to the effect that lobsters are becoming more plentiful,

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and that the increase is quite general along the coast. The Maine fishermen and also the dealers in that State are unstinted in their praise of the Bureau's work in this direction.

Arrangements have been made to transfer several carloads of live lobsters from the Maine coast for deposit at points in Puget Sound, about the San Juan Islands. These transfers will be continued annually until the feasibility of establishing this valuable crustacean on the Pacific coast has been demonstrated.

The adult lake sturgeon, referred to in the last annual report as being retained in a pen at the mouth of Rainy River, at Le Claire Point, Minn., with the view of gaining information as to the spawning habits of the species, escaped from the inclosure during a period of exceptionally high water early in October. Efforts to overcome the existing obstacles to the artificial propagation of the sturgeon will be renewed at the first opportunity.

In order to add to the commercial value of the eastern fisheries an attempt will be made to establish the humpback salmon on the Atlantic coast by the annual transfer of large numbers of eggs of that species from the Pacific coast, for development at the New England stations, the resulting fry to be placed in suitable streams in the State of Maine.

BIOLOGICAL INVESTIGATIONS, SURVEYS, AND EXPERIMENTS.

AID TO THE OYSTER INDUSTRY.

The Bureau has continued to devote to the oyster industry as much attention as the facilities and resources provided by Congress will permit. The field, however, is very large and varied, and the Bureau is unable to meet all the legitimate demands that are made on it for expert assistance and advice.

In December, 1912, the steamer *Fish Hawk* was ordered to Matagorda Bay, Tex., for the purpose of conducting a survey of the oyster beds in response to the request of the Fish and Oyster Commission of the State. Inquiries relating to the establishment of a biological station on the Gulf coast of Florida were conducted on the way and the vessel arrived off Lavaca Bay, Tex., early in February.

After consultation with the Texas commissioner and with persons interested in the oyster business it was determined that the survey should be confined to Lavaca Bay as the area of greatest present and prospective commercial importance. The recent triangulation by the United States Coast and Geodetic Survey had been carried to the mouth of this bay, and by the use of this and the recovery of an old point it was possible to extend the triangulation as far as required by means of the sextant. This preliminary work was completed in March, and the examination of the oyster beds commenced immediately. The weather was unusually tempestuous, and practically all the signals were destroyed by a tornado soon after their establishment. Despite the difficulties the work was completed about the middle of May. At the end of the fiscal year the smooth sheets were complete, and the report and chart will be ready for the printer by January 1, 1914.

Investigations and experiments respecting enemies of the oyster which annually cause large losses to the oyster industry have been

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continued as opportunity offered. During the spring the attention of the Bureau was again called to the prevalence of "green gill" over a large area in Chesapeake Bay. This peculiar condition, in reality harmless both to oysters and those who consume them, on account of popular prejudice has caused heavy loss by completely destroying the market for the affected oysters. The Bureau had no facilities for immediately investigating the matter, as the only qualified assistant was engaged in the Texas survey previously described, and the trouble had abated by the time he was available, only to grow virulent as soon as he was irrevocably detailed to other work.

The oyster interests of Long Island Sound are urging the study of the starfish and the drill, which annually cause heavy loss to the oyster growers, but the Bureau can not carry on the work continuously and systematically with its present force. These are but instances of the Bureau's failure to provide the assistance asked for by the fisheries, owing to the wholly inadequate personnel allowed it for the purpose.

PROGRESS IN MUSSEL CULTURE.

Marked progress has been made during the year in the cultivation of pearly fresh-water mussels, which are the objects of an extensive fishery and support numerous plants at which buttons are made.

The station at Fairport, Iowa, and the field parties operating in connection therewith have achieved practical results in the propagation of mussels. The work was conducted at 15 localities in the Mississippi Valley, 10 of which were on the Mississippi River. Over 150 million young mussels were planted, of which 57 million were liberated in Lake Pepin, 25 million in the vicinity of Fairport, and the remainder at other places in Iowa and Minnesota, and in Wisconsin, Illinois, Indiana, and Arkansas. As a necessary part of these operations there were handled about 100,000 food and game fishes of various species, of which a large number were rescued from overflowed lands and returned to the rivers. The field explorations were considerably curtailed on account of the embarrassment occasioned by the delay in the passage of the appropriation bill. An examination was made, however, of the mussel resources of the Illinois River, and a reconnoissance of a large number of lakes and streams in Minnesota opened up new fields for mussel culture and suggested new sources of supply of commercial shells.

Investigations in the field and laboratory have resulted in the discovery of the hosts and breeding habits of certain important commercial mussels and promise to result in the propagation of valuable species which previously could not be cultivated because of ignorance of fundamental facts. Research into the causes and phenomena of pearl formation have been continued.

INVESTIGATIONS OF LAKES AND STREAMS.

The investigation of the Illinois River in respect to the effects of the discharge of sewage through the Chicago Drainage Canal were brought to a conclusion during the year and a report thereon has been prepared. This is one of the most important studies of the

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effects of stream pollution on the fishes and fisheries, and it is believed that the results will be of great value in connection with the solution of problems which are yearly growing more acute. This work was conducted in cooperation with the Illinois Natural History Survey under conditions of great advantage to the Government.

The waters of the Truckee River Basin in California and Nevada have been under investigation at various times during the year. As has been indicated in previous reports of the Bureau, the use of the waters of this system for irrigation purposes has already reached a stage resulting in the destruction of large numbers of valuable food fishes. It appears inevitable that with the growth of the area irrigated the streams eventually will be reduced, in places, to practically dry beds at certain seasons, and the native fishes will become a negligible factor in the food supply. It is possible that a way may be found to compensate for this deficiency by introducing other species of nonmigratory habit which can be acclimatized in the permanent waters, but it is yearly becoming more evident that it will be necessary in some cases to make a frank recognition of the fact that more and cheaper food can be produced by the irrigation of the land than by the conservation of the fishes in the streams. It is the purpose of the present investigation to determine if it be possible to develop the one source of food supply while maintaining the other.

During the summer of 1912 the Bureau continued its examinations of lakes in Washington and Idaho to determine their physical and biological characteristics, particularly as they may affect the culture and acclimatization of fishes. It frequently happens that disappointing results follow the planting of fish in lakes which superficially appear to be admirably adapted to the purpose, and recent investigations have shown that the failures are often due to deficiencies in the physical conditions of the deeper waters. This work is demanded not only for the information of the Bureau in connection with its fish-cultural operations, but has been urgently requested by the State authorities. Similar work has been carried on for several years in Wisconsin in cooperation with the Wisconsin Geological and Natural History Survey. A reconnoissance was also made of a number of lakes in the Superior National Forest Reserve in northeastern Minnesota, which differ much in the character of their fauna from the lakes of more calcareous water farther south.

At the close of the fiscal year investigations were begun on Lake Champlain in cooperation with the State of Vermont, to determine whether it be possible to establish and maintain a commercial fishery for whitefish without jeopardizing fishing for pleasure and sport, which now yields remunerative business to guides, boatmen, and the keepers of pleasure resorts.

OTHER INVESTIGATIONS AND EXPERIMENTS.

The field work of the biological survey of San Francisco Bay was concluded during the year and considerable progress was made in the study of the collections which have been assigned to various specialists. The general report dealing largely with the economic results of the survey is in an advanced stage of preparation. This investigation was made by the steamer *Albatross* pending the pas-

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sage of an appropriation for repairs, without which she was unseaworthy and unfit to leave sheltered waters.

During July and August, 1912, the schooner *Grampus* was employed in an investigation of the oceanography of the Gulf of Maine, with the purpose of determining the physical and biological conditions governing the distribution of fish food and young fishes. The work was supplemented during the winter and spring by observations off the coast in the vicinity of Gloucester and on Georges Banks in connection with the otter-trawl investigations.

A related inquiry respecting the spawning of haddock was conducted off the coast of Massachusetts and New Hampshire during the spring, use being made of the facilities afforded by the recently established gill-net fishery for haddock. The spawning grounds of this species, which is extensively propagated by the Bureau, appear to be less restricted than has been generally supposed. The inquiry is to be continued as opportunity is afforded.

Terrapin culture at Beaufort reached a stage which justified the Bureau in issuing a circular descriptive of its methods and commending it as promising commercial returns to persons undertaking it on a practical scale. Considerable interest has been manifested in the project, and experiments are being conducted under private auspices in North Carolina and Florida.

During the spring, experiments in frog culture and in artificial production of the natural food of fishes were begun at the Edenton, N. C., station.

Considerable progress has been made during the year in the accumulation of material toward a series of publications on the life histories of important food fishes and other valuable aquatic animals. This necessarily is slow work and to a very large extent the data are collected as opportunity offers in connection with other investigations. The early larval stages of many American food fishes are unknown, and in order that the breeding grounds and the habitats of the young may be determined it is necessary to collect specimens and make drawings until a series is completed. This part of the investigation has yielded gratifying results, and there are now on hand several reports on the subject. It is the purpose of the Bureau to have the completed papers cover the points of which understanding is essential for the regulation and protection of the fisheries, and thus to meet a popular demand for information which there is now no means of satisfying.

WORK AT THE BIOLOGICAL LABORATORIES.

The marine laboratories at Woods Hole, Mass., and Beaufort, N. C., were opened at the beginning of the fiscal year, but were operated with considerable embarrassment owing to the inadequacy of the emergency appropriations made available pending the passage of the sundry civil bill. The months of June, July, August, and the first half of September comprise the period of greatest activity in scientific field and laboratory work, owing not only to the clemency of the weather and the greater opportunities afforded for study, but also to the availability at that time of a considerable number of qualified investigators who are occupied in university duties at other seasons.

The inadequacy of the permanent scientific staff of the Bureau makes it necessary to depend for much of its research on temporary

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assistants who can be engaged only when not engaged in their customary duties. It follows, therefore, that the monthly requirements during the first two months of the year are much in excess of the prorated allowance made by Congress for the purpose of conducting operations until the passage of the regular appropriation. Moreover, it is necessary to arrange for the employment of temporary assistants considerably in advance of the beginning of the fiscal year, not only because the best men will have made other arrangements before the end of June, but also because much of the work must be begun in June or earlier, and continuously prosecuted over the end of the fiscal year in order to produce results warranting the expenditures.

Therefore, unless confidence can be felt that appropriations will be available when due, the laboratory and field work can not be arranged for with proper regard to economy and efficiency, and this was the condition confronting the Bureau at the beginning of the fiscal year. A number of investigators had already reached the laboratories before it became apparent that the appropriations would not be available. Some of these were employed at reduced salaries and others elected to carry on work under the authority possessed by the Bureau to afford facilities to properly qualified investigators.

Under the conditions the work at both Woods Hole and Beaufort was satisfactory, and there were completed a number of researches of practical value, the most important of which related to the habits of fishes and the effects of water pollutions. Further work was conducted on the life history of the oyster drill with a view to finding a weak point at which this destructive oyster enemy may be attacked. At Beaufort the spawning season of the southern flounder was determined and experiments will be conducted during the next fiscal year to develop the possibility of its propagation at the station.

At the close of the year the permanent laboratory at the Fairport, Iowa, station was ready for occupancy. This station, which combines facilities for fish culture, mussel culture, practical shell testing, and biological and chemical investigations and experiments is designed as a center of a large part of the Bureau's activities in the Mississippi Valley.

DISEASES OF FISHES.

During the year the Bureau has received growing and insistent demands for the investigation of various fish diseases and for the study of the relations of industrial and other contaminations to the fish life in streams. These demands, which have come from Government, State, and private fish-cultural establishments, and from State, municipal, and private interests, are of a character that makes them entirely appropriate for attention at the hands of the Federal fishery service; but, owing to the lack of facilities, the Bureau has been able to do very little to help either itself or the general public in this respect.

The cooperative investigation of cancerous tumors in trout, in which the Bureau has been associated with the New York Laboratory for the Study of Malignant Disease, has been brought to a close by the completion of a report dealing with the cause and nature of the disease and its relation to human health. This but clears the ground for that part of the work which vitally concerns the Bureau,

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namely, the investigation of the means of preventing and curing the disease in streams and hatcheries. The cooperating institution is not concerned in this phase of the subject and any constructive work in the interests of the fisheries must be conducted by the Bureau.

From every consideration of economy adequate means should be provided for such investigations. At one hatchery alone—Holden, Vt.—over 350,000 trout died from an epidemic in May and June. This was practically the entire stock on hand and the cost to produce these fish, to say nothing of their ultimate value, was greater than would suffice to pay for an assistant qualified to find means of prevention of the losses.

ALASKA FISH AND FUR INDUSTRIES.

SALMON SERVICE.

Details regarding the administration of the salmon and other fisheries of Alaska will be found in a special report issued as a separate document.[a] As complete returns from these fisheries are not obtainable until late fall or early winter of each year, the information here presented is for the calendar year 1912.

For the purpose of enforcing the fishery laws and the regulations made thereunder, there has been the usual inspection of fishing grounds, apparatus, and methods; and information regarding the various branches of the fishing industry has been obtained and appears in the special report.

The laws and regulations have, in general, been well received by the fishing interests, and, with rare exceptions, have been respected throughout Alaska, so far as the field agents of the Bureau have been able to determine. The region is so vast, however, and the facilities so lamentably inadequate for reaching the various fishing localities, many in number and widely separated, that personal inspection in many cases was utterly impossible. Unfortunately this applies more particularly to the fisheries for which there is the greatest need of regular inspection. This fact, together with the limited personnel, and the limited appropriation available for traveling expenses, enables the Bureau at the best to possess no definite knowledge and but scant information regarding a large number of the fishing localities and operations.

The inspection of the canneries, salteries, and hatcheries was more satisfactory. One agent covered the territory from Dixon Entrance on the south to Cordova on the north. Of the 53 canneries operated in that region he visited all but 5 at least once, and most of the salteries and minor establishments; and each of the hatcheries was visited and inspected. Several of the more accessible places were each visited two or three times. In the Bristol Bay region it was not possible to reach all the canneries and fisheries, and only those at or near Nushagak were visited. In central Alaska an agent was able to visit the canneries at the Kusilof and Kenai Rivers, and the inspector kept in close touch with the fishing operations in and about the Afognak reservation during the season.

The season of 1912 was marked by an unusually heavy run of salmon on the south side of Bristol Bay, which resulted in an increase

[a] Alaska Fishery and Fur Industries in 1912, Bureau of Fisheries Document No. 780.

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of nearly 40 per cent over the 1911 pack of that region. There was also an unprecedented run of humpback salmon in central Alaska and a large run in Bering Sea. A slight decline in the humpback run occurred in southeast Alaska, where the red salmon practically held their own. There was a shortage of red salmon in the Nushagak region and in central Alaska, which induced an increased pack of the inferior species in those regions.

The Alaska fisheries as a whole were more productive in 1912 than ever before. This was owing largely to the great increase in the catch of the cheaper grades of salmon. The net increase in the salmon catch over 1911 was over 16,963,000 fish. The value of the product of all the fisheries showed an increase over that for 1911 of more than $2,000,000. The aggregate catch of salmon was 60,938,945, from which were prepared 4,056,021 cases of canned salmon valued at $16,295,480, and in addition to these were minor products of the salmon fisheries valued at $837,652. The number of salmon canneries increased from 64 to 87, the majority of the new plants being in southeast Alaska.

In 1911 the five private hatcheries took 167,146,800 red salmon eggs and the two Government hatcheries 102,520,000, making a total of 269,666,800, from which were hatched and liberated 153,868,800 fry by the private and 87,729,700 by the Government hatcheries, a total of 241,598,500. In 1912 the private hatcheries took 86,295,000 red salmon eggs and the Government hatcheries 80,814,470, a total of 167,109,470, which is a decrease of 102,557,330 as compared with 1911.

Under the provision of law exempting from taxation the output of the salmon canneries at the rate of 10 cases of canned salmon for each thousand red or king salmon fry liberated, the companies maintaining private hatcheries were entitled to receive in 1912 rebates on 153,868,800 fry, or $61,744.

The order of the Secretary of Commerce and Labor of December 19, 1907, closing Wood and Nushagak Rivers to salmon fishing, remains in force and no commercial fishing was carried on in those streams. With the cooperation of the companies operating canneries in the Nushagak region, Wood River was again racked in 1912, and a tally was kept of the red salmon ascending that stream to Lake Aleknagik for spawning purposes. The number of fish thus counted was 325,264, as against 354,299 in 1911. The number of salmon caught in the Nushagak region was 3,866,950, an increase of 1,053,313 over that for the previous year. In the five years from 1908 to 1912 the catch in the Nushagak region has decreased 37 per cent, while the number escaping to the spawning beds has decreased 87 per cent. In 1908 the number escaping was 30 per cent of the entire run; in 1912 it was but 7.7 per cent. This indicates a very serious condition if natural propagation alone is to be depended upon to keep up the supply of salmon in that region.

The usual statistical canvass of the Alaska fisheries showed 24,263 persons engaged in the various branches of the industry, $38,263,457 invested, and products valued at $18,877,480.

A feature of the Alaska fisheries is a growing appreciation of the value of products formerly regarded as useless and the equipment of a number of small plants designed to utilize such materials. Only

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a very small fraction of the multitude of natural aquatic products of Alaska—fishes, mollusks, crustaceans, etc.—has as yet been utilized by man. It is known that many of these possess a high food value, but methods of preparing them as food have not been developed. Of fishes alone there are more than 300 species, of which fewer than a score are as yet utilized by man as food. How many more can be found to possess considerable economic food value remains to be determined, but that the number is large is reasonably certain. Perhaps the most promising is the herring (*Clupea pallasii*), a very abundant fish, at present utilized chiefly in the manufacture of fertilizer and oil, but used to some extent fresh, frozen, or pickled, or as bait in the halibut fishery. A closely related species, the Atlantic herring (*Clupea harengus*), is the fish which supports the largest fishery in the world, also the American sardine and smoked-herring industries, in which a vast amount of money is invested and whose output is worth millions of dollars. There is no inherent reason why the Pacific herring may not be prepared for sardines and in the numerous other ways in which the Atlantic herring is utilized.

The eulachon, the capelin, and the surf smelt, three most delicious fishes, literally swarm in untold numbers in Alaskan waters, but as yet are utilized scarcely at all. The Dolly Varden trout, so abundant as to be a great nuisance and very destructive to salmon spawn, should be studied with reference to its utilization as food. The score or more of surf fishes, rock cods, greenlings, Atka mackerel, sculpins, and sand lances, are all promising species to experiment with. There are also the clams, crabs, and numerous other crustaceans and mollusks, related species of which in other countries support important fisheries, yet nothing is done with them in Alaska.

Under date of November 18, 1912, after a hearing given at Seattle, Wash., on October 18, the Secretary issued an order prohibiting, until further notice, all commercial fishing for salmon (1) in all streams flowing into Cook Inlet, together with their lakes and tributary waters; (2) in Eyak Lake and its tributary waters, except that fishing is permitted, under specified restrictions, in Eyak River below the lake; (3) in Anan or Humpback Creek, its lagoon, lakes, and tributary waters, together with the region within 500 yards of the mouth of the creek; and (4) in Naha Stream, its lagoon, lakes, and tributary waters, above a line connecting Loring Point and House Point. The order became effective January 1, 1913.

By order of the Secretary, dated March 21, the natives of the Afognak reservation were given permission to conduct commercial fishing in the reserved waters under certain restrictions. The business was placed in charge of an inspector, who issued permits to those entitled to receive them, promulgated regulations in accordance with general orders from the Department, kept in daily touch with the fishery, and enforced compliance with the regulations. The total number of licenses issued was 93, of which 7 were to white men. The salmon taken numbered about 175,000 fish, including about 17,000 handled at the hatchery. This catch was somewhat disappointing. The eruption of Katmai Volcano June 6 covered Afognak Island so completely with ashes that fishing was entirely suspended for more than two weeks and was nowhere fully resumed. This no doubt had

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a serious effect on the catch, which otherwise would in all probability have been much greater. Besides the immediate effects on the fishery there will no doubt be after effects from which the fishery will not recover for some years.

FUR-SEAL SERVICE.

The sealing operations on the Pribilof Islands during the season of 1912 were conducted, as in 1910 and 1911, under the direct control of the fur-seal agents of the Bureau. The treaty of July 7, 1911, which makes pelagic sealing unlawful, went into effect December 15, 1911, and, as a result, there was no pelagic sealing during the season of 1912. This was the first season, therefore, since the beginning of pelagic sealing that the fur-seal herd was not subject to the ravages of the sealing fleet. To this essential protective measure the herd made an immediate response. It was possible for the first time in the history of the fur seal to take an actual census of the herd. An actual count was made of all the active bulls, all the idle and young bulls, all the hauling-ground bulls, all the 3-year-old males marked and reserved for breeders, all the pups, and, by evident deduction, all the cows. The only classes not actually counted were the yearling males and females, the 2-year-old males and females, the unbranded 3-year-old males, and an uncertain number of 4-year-old males, all of which were estimated conservatively at 48,000.

The census of the herd showed seals of the various classes present on the islands as follows:

Active bulls, with harems (actual count)	1,358
Idle and young breeding-ground bulls (actual count)	312
Hauling-ground bulls (actual count)	302
Branded reserve bulls (actual count)	2,000
Pups (actual count)	81,984
Breeding cows (equal to the pups in number)	81,984
Remaining nonbreeding seals (estimate)	48,000
Total	215,940

The census for 1911 was based chiefly on estimates and was evidently an underestimate. Nevertheless, it is believed that there were on the islands in 1912 at least 30,000 seals that would not have been there if pelagic sealing had continued. During the season of 1911 the pelagic sealers took 14,511 skins, according to the report of Messrs. C. M. Lampson & Co., of London. This number included some skins from the Commander Islands herd. It is well known that the pelagic sealers kill many seals they do not recover and that the actual number of skins marketed is far below and probably is less than half the number of seals actually killed. With this exceedingly low estimate it is evident that the loss actually sustained by the Pribilof herd in 1911 could not have been less than 15,000 breeding females; and it is safe to assume that as great a loss would have occurred in 1912 if pelagic sealing had gone on. These 15,000 breeding females thus saved produced 15,000 pups, making 30,000 seals on the islands in 1912 as the immediate response to the cessation of pelagic sealing.

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In 1913 a census of the seal herd made under the same conditions as in 1912 and participated in by two or three cooperating agents of the Bureau gave the following result, the number of the pups being accurately determined by actual count after the harems had broken up in August and the equivalent number of breeding females being necessarily present:

Active bulls, with harems (actual count)	1,403
Idle and young bulls (actual count)	364
Bachelors, 1, 2, 3, and 4 years old (count and estimate)	47,000
Cows 1 and 2 years old (count and estimate)	35,000
Breeding cows (equal to pups)	92,269
Pups (actual count)	92,269
Total	268,305

The number of skins shipped in 1912 was 2,880 from St. Paul Island and 884 from St. George Island, a total of 3,764. These, together with 9 skins from the previous season which had been sent to Washington for experimental purposes, were sold at auction in London January 17, 1913, by Messrs. C. M. Lampson & Co., acting as agents for this Government. The net proceeds of the sale were $130,640.57, for which sum a certified check was duly received and covered into the United States Treasury. Under the leasing system which prevailed prior to 1910 the Government would have received only $38,589.25 for the season's take of skins.

The fox skins obtained on the Pribilof Islands in the winter of 1911–12 consisted of 109 blues and 27 whites on St. Paul, and 275 blues and 2 whites on St. George, a total of 384 blues and 29 whites. They were sent to London and sold at auction March 7, 1913, by Messrs. C. M. Lampson & Co., acting as agents for this Government. The net proceeds of the sale were $20,505.17, for which sum a certified check was duly received and covered into the Treasury. A choice lot of 28 skins from St. Paul Island sold for $131 per skin. Under the old leasing system the Government received nothing for the fox skins.

On June 30, 1913, the positions of agent and three assistant agents, fur-seal fisheries, ceased to exist through failure of Congress to provide for them. The sundry civil appropriation bill for the year 1914 substituted for the foregoing the positions of two agents and caretakers.

MINOR FUR-BEARING ANIMALS.

The warden and four deputy wardens, for which provision was made in the sundry civil bill making appropriations for the fiscal year 1912, spent the entire year in Alaska, establishing headquarters in certain of the more important fur-producing regions where they could keep in touch with the trappers and hunters and see that the law and regulations were observed. A study of the habits of the various species of fur-bearing animals was thus possible, and a large amount of valuable information was obtained. Specimens were also collected for the purpose of making possible a study of the condition of the fur at different seasons in the various fur-producing regions of Alaska. Such specimens are very useful in arriving at decisions as to the proper dates for close seasons in the different parts of Alaska.

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The cooperative arrangement made with the governor of Alaska for the purpose of securing a more effective enforcement of the fur and game laws of the Territory has been continued, in part. By this arrangement the warden and the four deputy wardens were to be appointed as special game wardens and five of the Alaska game wardens were to be appointed special fur wardens. In the early part of 1913 the governor found it impracticable to continue longer the services of the special game wardens appointed by him. The Bureau, however, finds it desirable to continue the services of the special fur wardens. They are paid a nominal salary of $10 per month and are invested with the same authority for enforcing the provisions of the law and regulations as are the regular wardens. The scope of territory to be covered makes it necessary to secure the assistance of as many agents as possible.

During the past year three convictions have been had for violation of the act of April 21, 1910, for the protection of the fur-bearing animals in Alaska. The convictions were for violations in widely separated portions of Alaska, and it is believed that they will have a deterrent effect upon those disposed to violate the law.

The regulations issued by the Department have proved satisfactory in most respects and have had a very good influence upon the hunters and trappers who, in the main, are in sympathy with the efforts of the Government to conserve the fur resources of Alaska. One immediate effect has been a very marked improvement in the quality of furs shipped from the Territory. Several large buyers of Alaska furs state that the improvement has been 25 to 30 per cent. This was due to the fact that the hunters and trappers were more careful to observe the close season and local buyers were less disposed to purchase unprime skins.

As a result of the inquiries made by the warden and the deputy wardens, together with information received from persons interested in the preservation of the fur resources of Alaska, the desirability of revising the regulations promulgated March 8, 1911, was shown. Revised regulations were accordingly drafted and approved by the Secretary under date of March 26, 1913. The principal changes in the new regulations are: (1) The close season on sea otter is extended to November 1, 1920, and that on beaver to November 1, 1918; (2) minor changes are made in the open and close seasons for several of the other fur bearers; (3) the close season on the black bear is removed; and (4) prohibition is placed upon the taking or selling of unprime skins.

The following statement shows by species the number and value of furs shipped from Alaska in the year ending November 15, 1912:

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Species.	Number.	Average value.	Total value.
Bear, black	698	$7.50	$5,212.50
Bear, brown	19	9.00	171.00
Bear, glacier	5	15.00	75.00
Bear, polar	9	40.00	360.00
Beaver	89	10.00	890.00
Ermine	7,957	1.36	10,821.52
Fox, black	3	600.00	1,800.00
Fox, blue	502	45.00	22,590.00
Fox, blue, Pribilof Islands	384	56.53	21,708.48
Fox, cross	603	17.00	10,251.00
Fox, red	8,018	8.50	68,153.00
Fox, silver gray	142	250.00	35,500.00
Fox, white	3,108	12.50	38,850.00
Fox, white, Pribilof Islands	29	17.29	501.43
Hare, Arctic	55	.40	22.00
Lynx	2,720	21.50	58,480.00
Marten	12,999	12.50	162,487.50
Muskrat	123,925	.40	49,570.00
Mink	31,363	4.50	141,133.50
Otter, land	1,480	14.00	20,720.00
Otter, sea	1	200.00	200.00
Reindeer, fawn	4	1.00	4.00
Seal, fur	3,764	37.52	141,290.32
Seal, hair	333	1.50	499.50
Squirrel	611	.08	48.88
Wolf	103	9.00	927.00
Wolverine	189	10.00	1,890.00
Total			794,156.63

A number of permits have been issued authorizing the taking and shipping of various fur-bearing animals, principally foxes, for breeding purposes. Applications for permits for such operations became so frequent as to cause concern in regard to the maintenance of the natural supply of wild stock. The Department decided to issue further permits for the shipment of foxes from Alaska only to bona fide owners or operators of fox ranches and to make such permits applicable only to foxes which had been bred and reared on these ranches. It was also decided to discontinue the issuance of permits authorizing the capture in Alaska of any fur-bearing animal during the close season prescribed for the species concerned.

Recently the rearing of foxes for their pelts has attracted a great deal of attention, and public interest has been aroused by the reports of extraordinary prices paid for certain varieties for breeding purposes. To develop the possibilities of fox farming in Alaska the Secretary of Commerce has decided to lease certain islands for the purpose, making announcement to this effect in a widely distributed circular.

COMMERCIAL FISHERIES.

OYSTER INDUSTRY.

In the recent canvass of the oyster industry the statistics for the New England and South Atlantic States covered the season ending in 1910; for the Middle Atlantic States, except Maryland and Virginia, and for the Gulf States they covered 1911; and for Maryland and Virginia and the Pacific Coast States they covered 1912. The total number of persons engaged in the oyster industry of the United States, as shown by the statistics for the various sections of the country, was 67,257; the yearly wages paid, combining the different sections, amounted to $10,876,801; and the investment in vessels, boats, fishing apparatus, shore and accessory property and cash capital, not including the value of oyster grounds or the cash capital for the New

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England States, was $16,880,032. The output of oysters was 32,988,815 bushels, valued at $15,377,983.

About 46 per cent of the quantity and 65 per cent of the value were from planted grounds, the output in many of the States depending largely—in some of them entirely—upon oyster culture. In the New England States 93 per cent, on the Pacific coast 73 per cent, and in New York 86 per cent of the oyster product is derived from private beds. Virginia ranks first among the States in quantity and New York first in value of oysters produced; while Maryland, ranking second in quantity, is third in value of oyster output. A summary of the oyster product of the United States is given in the following table:

OYSTER PRODUCT OF THE UNITED STATES.

Region.	Private grounds.		Public grounds.		Total.	
	Bushels.	*Value.*	*Bushels.*	*Value.*	*Bushels.*	*Value.*
New England States (1910)....	5,549,318	$3,439,450	392,703	$157,584	5,942,021	$3,597,034
Middle Atlantic States (1911-12).....	7,090,883	5,204,124	11,815,193	4,059,432	18,906,076	9,263,556
South Atlantic States (1910)...	456,194	171,298	1,244,804	192,886	1,700,998	364,184
Gulf States (1911).....	2,080,005	634,147	4,146,136	842,819	6,226,141	1,476,966
Pacific Coast States (1912).....	157,243	659,430	56,336	16,813	213,579	676,243
Total.....	15,333,643	10,108,449	17,655,172	5,269,534	32,988,815	15,377,983

The oyster industry of various sections has been presented in detail in previous reports. The only portions of the country that remain to be considered are Maryland, Virginia, and the Pacific Coast States.

Maryland ranks first among the States in the number of persons engaged in the oyster industry, which, in 1912, was 24,287, who received $2,724,641 in wages. The yield of oysters was 5,510,421 bushels, valued at $2,127,759, of which only about 5 per cent, or 280,010 bushels, valued at $149,069, were from planted grounds. The output would probably have been much larger had it not been for a severe freeze lasting for about six weeks, during which time the taking of oysters was practically discontinued. In some localities, especially in Kent and Queen Anne Counties, the oysters were more plentiful and in better condition than for many years. The product was taken chiefly with dredges and tongs. Patent tongs are used in a few localities, mainly at Solomons in Calvert County and at Rock Hall in Kent County; they are employed mostly where the water is too deep for common tongs and dredging is not allowed. The principal oyster centers in the State are Baltimore, Crisfield, Cambridge, St. Michaels, Oxford, Chester, Annapolis, Tilghman, and Whitehaven. Out of a total of 3,769,766 gallons of oysters shucked in the State, 1,447,527 gallons were opened at Baltimore, 686,800 gallons at Crisfield, 612,717 gallons at Cambridge, and the remainder at other localities. Baltimore has also an important oyster-canning industry, which is carried on in connection with the canning of fruit and vegetables. The canned-oyster product amounted to 10,170,608 cans, valued at $775,907.

Virginia ranks next to Maryland in the number of persons engaged in the oyster industry, which was 16,487 in 1912, and the wages paid amounted to $2,112,170. The oyster output was 6,206,098 bushels, valued at $2,286,340, of which 36.38 per cent, or 2,257,873 bushels, valued at $1,128,830, were from planted grounds.

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Statistics of the oyster industry of Maryland and Virginia in 1912 are given in detail in the following table:

OYSTER INDUSTRY OF MARYLAND AND VIRGINIA, 1912.

MARYLAND.

Items.	Private areas.		Public areas.		Total.	
	Number.	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*
Persons engaged:						
On vessels fishing	3		4,086		4,089	
On vessels transporting	8		808		816	
In shore or boat fisheries	524		8,930		9,454	
Shoresmen	45		9,883		9,928	
Total	580		23,707		24,287	
Wages paid:						
Dredging		$790		$466,385		$467,175
Tonging		35,068		967,184		1,002,252
Transporting		590		101,197		101,787
Planting and transporting		5,020				5,020
Wholesale trade		4,855		1,143,552		1,148,407
Total		46,323		2,678,318		2,724,641
Vessels, boats, apparatus, and other property:						
Vessels fishing	1	500	771	542,375	772	542,875
Net tonnage	7		7,895		7,902	
Vessels transporting	4	3,000	299	351,125	303	354,125
Net tonnage	35		7,286		7,321	
Gasoline boats	25	8,675	1,324	260,765	1,349	269,440
Sail and row boats	146	4,480	3,203	235,720	3,349	240,200
Apparatus—vessel fisheries—						
Dredges			3,017	34,927	3,017	34,927
Tongs	6	30	73	509	79	539
Apparatus—boat fisheries—						
Dredges	8	60	1,595	14,029	1,603	14,089
Tongs	170	776	9,240	47,516	9,410	48,292
Shore and accessory property		12,215		1,665,985		1,678,200
Cash capital		1,900		795,500		797,400
Total		31,636		3,948,451		3,980,087
Planting operations:						
Oyster grounds owned or leased.....acres	[a] 3,445.00	186,525			[a] 3,445.00	186,525
Oyster grounds under culture.....acres	2,270.00				2,270.00	
Grounds planted during the year.....acres	219.00				219.00	
Materials planted during the year—						
Seed oysters.bushels	68,160	18,416			68,160	18,416
Oyster shells....do	26,350	948			26,350	948
Total		19,364				19,364
Oysters on private areas at the end of the year, bushels	769,785	210,028			769,785	210,028
Products:						
Vessel fisheries—						
With dredges—market oysters....bushels	150	60	1,852,940	830,605	1,853,090	830,665
With tongs—market oysters.....bushels	1,150	608	17,430	7,063	18,580	7,671
Total	1,300	668	1,870,370	837,668	1,871,670	838,336
Boat fisheries—						
With dredges—market oysters....bushels	6,050	3,075	446,758	175,618	452,808	178,693
With tongs—						
Market oysters, bushels	272,660	145,326	2,900,333	961,777	3,172,993	1,107,103
Seed oysters, bushels			12,950	3,627	12,950	3,627
Total	278,710	148,401	3,360,041	1,141,022	3,638,751	1,289,423
Grand total	280,010	149,069	5,230,411	1,978,690	5,510,421	2,127,759

[a] Includes 330.50 acres held by tenure other than lease.

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Oyster Industry of Maryland and Virginia, 1912—Continued.

MARYLAND—Continued.

Items.	Private areas.		Public areas.		Total.	
	Number.	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*
Wholesale trade:						
Market oysters sold in the shell.....bushels..					136,617	$139,820
Oysters sold opened..gals..					[a]3,769,766	3,588,873
Oysters canned.....cans..					10,170,608	775,907
Oyster shells sold..bushels..					4,893,297	73,128
Crushed oyster shells sold.....tons..					10,000	54,375
Lime from oyster shells, tons.....					3,968	8,070
Total.....						4,640,173
Expenses connected with the wholesale trade.....						872,326

VIRGINIA.

Persons engaged:						
On vessels fishing.....	155		509		664	
On vessels transporting....	160		657		817	
In shore or boat fisheries...	3,624		7,736		11,360	
Shoresmen.....	3,646				3,646	
Total.....	7,585		8,902		16,487	
Wages paid:						
Dredging.....		$49,245		$108,900		$158,145
Tonging.....		188,288		1,013,743		1,202,031
Transporting.....		23,670		75,060		98,730
Planting and transplanting		107,894				107,894
Protecting oysters from natural enemies.....		199				199
Wholesale trade.....		545,171				545,1.1
Total.....		914,467		1,197,703		2,112,170
Vessels, boats, apparatus, and other property:						
Vessels fishing.....	32	77,450	92	53,125	124	130,575
Net tonnage.....	324		807		1,131	
Vessels transporting.....	84	60,000	454	296,400	538	356,400
Net tonnage.....	1,035		5,065		6,100	
Gasoline boats.....	398	132,510	954	214,145	1,352	346,655
Sail and row boats	1,947	54,203	3,964	217,960	5,911	272,163
Apparatus—vessel fisheries—						
Dredges.....	96	1,735	334	4,040	430	5,775
Tongs.....	2	25	9	65	11	90
Apparatus—boat fisheries—						
Dredges.....	77	825	509	4,722	586	5,547
Tongs.....	2,094	7,847	6,256	27,529	8,350	35,376
Shore and accessory property.....		497,520				497,520
Cash capital.....		528,200				528,200
Total.....		1,360,315		817,986		2,178,301
Planting operations:						
Oyster grounds owned or leased..... .....acres..	[b]59,272.60	767,015			[b]59,272.60	767,015
Oyster grounds under culture.....acres..	25,979.34				25,979.34	
Grounds planted during the year.....acres..	2,671.11				2,671.11	
Materials planted during the year—						
Seed oysters...bush..	1,291,090	266,194			1,291,090	266,194
Oyster shells....do....	743,250	21,897			743,250	21,897
Total.....		288,091				288,091

[a] Exclusive of opened oysters bought from dealers in Virginia.
[b] Includes 2,469.96 acres used for bedding oysters, but does not include oyster grounds held by riparian right.

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Oyster Industry of Maryland and Virginia, 1912—Continued.

VIRGINIA—Continued.

Items.	Private areas.		Public areas.		Total.	
	Number.	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*
Planting operations—Contd.						
Expenses connected with planting—						
Planting and transplanting		$675				$675
Protecting oysters from natural enemies		366				366
Total		1,041				1,041
Oysters on private areas at the end of the year, bushels	5,872,440	1,899,819			5,872,440	1,899,819
Products:						
Vessel fisheries—						
With dredges—market oysters....bushels	485,639	280,030	171,795	$60,572	657,434	290,602
With tongs—market oysters.....bushels	1,500	800	6,825	2,600	8,325	3,400
Total	487,139	280,830	178,620	63,172	665,759	294,002
Boat fisheries—						
With dredges—market oysters....bushels	93,600	48,970	216,300	84,715	309,900	133,685
With tongs—						
Market oysters, bushels	1,660,603	842,864	1,769,755	675,974	3,430,358	1,518,838
Seed oysters, bushels	16,531	6,166	1,783,550	333,649	1,800,081	339,815
Total	1,770,734	898,000	3,769,605	1,094,338	5,540,339	1,992,338
Grand total	2,257,873	1,128,830	3,948,225	1,157,510	6,206,098	2,286,340
Wholesale trade:						
Market oysters sold in the shell.....bushels					400,628	278,138
Oysters sold opened..gals					2,347,434	2,181,007
Oysters canned.....cans					134,784	8,356
Oyster shells sold..bush					1,907,488	41,406
Crushed oyster shells sold.....tons					8,400	37,300
Lime from oyster shells, tons					23,627	107,388
Total						2,653,590
Expenses connected with the wholesale trade						257,739

Note.—In Maryland the revenue to the State from leases on oyster grounds, license fees, and other sources, in 1912, was $83,997, and the cost of administration was $117,949. In Virginia the revenue to the State was $61,305. There was considerable interchange of persons, boats, and apparatus between private and public areas in both of these States, but in the above table they are shown where they did the most work.

Comparative Statistics of the Oyster Product of Maryland and Virginia for Various Years from 1880 to 1912.[a]

Years.	Maryland.		Virginia.	
	Bushels.	*Value.*	*Bushels.*	*Value.*
1880	10,600,000	$4,730,476	6,837,320	$2,218,376
1887	8,148,217	2,683,435	2,921,139	1,002,901
1888	8,531,658	2,877,790	3,664,433	1,336,012
1890	10,450,087	4,854,746	6,074,025	2,482,348
1891	9,945,058	5,295,866	6,162,086	2,524,348
1897	7,254,934	2,885,202	7,023,848	2,041,683
1901	5,685,561	3,081,518	7,885,447	2,923,456
1904	4,429,650	2,417,674	7,612,289	3,459,676
1908	6,232,000	2,228,330	5,075,000	2,347,780
1912	5,510,421	2,127,759	6,206,098	2,286,340

[a] The statistics for 1908 in this table are from data published by the Bureau of the Census. The products of Virginia for 1887 do not include those of the James and Potomac Rivers.

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In the Pacific Coast States in 1912 there were 800 persons engaged in the oyster industry, and the amount of wages paid was $260,895. The output was 213,579 bushels of market and seed oysters, having a value of $676,243, of which 157,243 bushels, valued at $659,430, were from private grounds.

In California the oyster industry, including the cultivation of oysters and the oyster trade, centers in San Francisco, and the oyster grounds are located chiefly in San Francisco Bay, although there are oyster grounds also in Tomales and Humboldt Bays. In San Francisco Bay sting rays are abundant at times, and in order to protect the oysters from them stockades are built around the oyster grounds. These are usually made of pickets, 2 by 3 inches in size, and from 14 to 16 feet high. The oyster product of the State is all obtained from private grounds, and the season extends practically through the entire year. The yield of oysters was 68,037 bushels, valued at $280,344, of which all except 600 bushels of native oysters, valued at $1,800, were eastern oysters grown from seed oysters brought from the Atlantic coast and planted on the local beds. In addition to the eastern and native oysters produced on the west coast, market oysters from the Atlantic coast are also handled by the dealers at San Francisco.

In Oregon the oyster grounds are in Yaquina Bay. The product of native and eastern oysters in 1912 was 2,213 bushels, valued at $9,050. In Washington the oyster grounds are in Willapa Bay, Grays Harbor, and in the bays and inlets in Puget Sound. As in other States on the Pacific coast these oyster grounds are usually exposed at low tide, and in winter the oysters are in danger of freezing when the tide is out. In order to retain water on the grounds dikes have been built in some localities. Shells have been planted on grounds inclosed by dikes for the purpose of rendering the bottom suitable for oyster planting, and also to secure a set of oyster spat. Both native and eastern oysters are used for planting purposes. Some Japanese oysters were planted in Willapa Bay about 10 years ago. In 1912 about 20,000 of these oysters were planted as an experiment within the dikes on private beds in Hood Canal. The oyster product of Washington amounted to 143,329 bushels of native and eastern oysters, having a value of $386,849, about 61 per cent of which were from planted grounds.

Following are detailed statistics of the oyster industry of the Pacific Coast States in 1912:

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Oyster Industry of the Pacific Coast States, 1912.

Items.	California.		Oregon.						Washington.						Grand total.	
	Private areas.		Private areas.		Public areas.		Total.		Private areas.		Public areas.		Total.			
Persons engaged:	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*
On vessels fishing									12				12		12	
On vessels transporting	3								5				5		8	
In shore or boat fisheries	119		18				18		390		99		489		626	
Shoresmen	90								64				64		154	
Total	212		18				18		471		99		570		800	
Wages paid:																
Dredging										$5,033				$5,033		$5,033
Tonging		$12,008		$1,600		$2,000		$3,600		40,435		$13,525		53,960		69,568
Transporting		4,240								10,375				10,375		14,615
Planting and transplanting		42,535								34,035				34,035		76,570
Protecting oysters from natural enemies										1,180				1,180		1,180
Wholesale trade		69,571								24,358				24,358		93,929
Total		128,354		1,600		2,000		3,600		115,416		13,525		128,941		260,895
Vessels, boats, apparatus, and other property:																
Vessels fishing									7	27,000			7	27,000	7	27,000
Net tonnage									59				59		59	
Vessels transporting	5	32,500							12	22,000			12	22,000	17	54,500
Net tonnage	82								78				78		160	
Gasoline boats	11	9,550	4	1,600			4	1,600	35	18,350			35	18,350	50	29,500
Sail and row boats	134	21,750	43	2,455			43	2,455	545	24,459			545	24,459	722	48,664
Apparatus—vessel fisheries—dredges									16	323			16	323	16	323
Apparatus—boat fisheries—																
Dredges									2	30			2	30	2	30
Tongs	178	1,254	50	800			50	800	694	3,457			694	3,457	922	5,511
Shore and accessory property		275,350								55,775				55,775		331,125
Cash capital		1,085,000								46,000				46,000		1,131,000
Total		1,425,404		4,855				4,855		197,394				197,394		1,627,653

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Oyster Industry of the Pacific Coast States, 1912—Continued.

Items.	California.		Oregon.						Washington.						Grand total.	
	Private areas.		Private areas.		Public areas.		Total.		Private areas.		Public areas.		Total.			
Planting operations:	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*	*Number.*	*Value.*
Oyster grounds owned or leased.....acres..	a35,448.12	$449,775	41.83	$16,000	.....	.....	41.83	$16,000	15,934.05	$832,830	.....	.....	15,934.05	$832,830	51,424.00	$1,298,605
Oyster grounds under culture.....acres..	6,717.00	.....	41.83	.....	.....	.....	41.83	.....	4,450.15	.....	.....	.....	4,450.15	.....	11,208.98	.....
Grounds planted during the year... acres..	100.00	.....	.....	.....	.....	.....	.....	.....	529.00	.....	.....	.....	529.00	.....	629.00	.....
Materials planted during the year—																
Seed oysters, bushels.....	8,600	24,239	.....	.....	.....	.....	.....	.....	108,005	141,391	.....	.....	108,005	141,391	b 116,605	165,630
Oyster shells, bushels.....	6,000	600	.....	.....	.....	.....	.....	.....	33,650	4,550	.....	.....	33,650	4,550	39,650	5,150
Total.....	.....	24,839	.....	.....	.....	.....	.....	.....	.....	145,941	.....	.....	.....	145,941	.....	170,780
Expenses connected with planting—																
Planting and transplanting.....	.....	2,026	.....	.....	.....	.....	.....	.....	.....	12,275	.....	.....	.....	12,275	.....	14,301
Protecting oysters from natural enemies.....	.....	8,915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,915
Total.....	.....	10,941	.....	.....	.....	.....	.....	.....	.....	12,275	.....	.....	.....	12,275	.....	23,216
Oysters on private areas at the end of the year—																
Native....bushels..	3,100	6,390	500	900	.....	.....	500	900	555,425	832,570	.....	.....	555,425	832,570	559,025	839,860
Eastern.....do....	98,500	311,000	500	1,500	.....	.....	500	1,500	191,310	532,775	.....	.....	191,310	532,775	290,310	845,275
Total.....	101,600	317,390	1,000	2,400	.....	.....	1,000	2,400	746,735	1,365,345	.....	.....	746,735	1,365,345	849,335	1,685,135
Products:																
Vessel fisheries—with dredges—																
Market oysters, native.....bushels..	.....	.....	.....	.....	.....	.....	.....	.....	4,300	12,200	.....	.....	4,300	12,200	4,300	12,200
Market oysters, eastern..bushels..	.....	.....	.....	.....	.....	.....	.....	.....	22,230	84,017	.....	.....	22,230	84,017	22,230	84,017
Total.....	.....	.....	.....	.....	.....	.....	.....	.....	26,530	96,217	.....	.....	26,530	96,217	26,530	96,217

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Boat fisheries—																
With dredges—																
Market oysters, native, bushels									20	72			20	72	20	72
Market oysters, eastern, bushels									1,305	4,906			1,305	4,906	1,305	4,906
With tongs—																
Market oysters, native, bushels	600	1,800	413	1,450	600	$2,000	1,013	3,450	42,530	206,613			42,530	206,613	44,143	211,863
Market oysters, eastern, bushels	67,437	278,544	1,200	5,600			1,200	5,600	15,408	61,228			15,408	61,228	84,045	345,372
Seed oysters, native, bushels									1,800	3,000	55,736	$14,813	57,536	17,813	57,536	17,813
Total	68,037	280,344	1,613	7,050	600	2,000	2,213	9,050	61,063	275,819	55,736	14,813	116,799	290,632	187,049	580,026
Grand total	68,037	280,344	1,613	7,050	600	2,000	2,213	9,050	87,593	372,036	55,736	14,813	143,329	386,849	213,579	676,243
Wholesale trade:																
Market oysters sold in the shell, native, bushels	10,867	43,078											8,658	49,003	19,525	92,081
Market oysters sold in the shell, eastern, bushels	48,914	186,440											4,577	19,898	53,491	206,338
Oysters sold opened, native.....gallons..	4,950	17,325											40,137	114,278	45,087	131,603
Oysters sold opened, eastern.....gallons..	57,886	204,894											2,537	5,501	60,423	210,395
Oyster shells sold, bushels	63,700	2,345											5,600	830	69,300	3,175
Total		454,082												189,510		643,592
Expenses connected with wholesale trade		25,267												16,338		41,605

[a] Estimated.

[b] Includes 54,315 bushels of eastern oysters, valued at $139,453.

NOTE.—In addition to the oyster grounds shown for Washington in the above table as owned or leased, there are 22,477.89 acres which have been taken up, but have not been used for oyster planting. In Washington the revenue to the State from sales and leases of oyster grounds, tonging licenses, and commodity tax, in 1912, was $3,085. California and Oregon derive no revenue from oyster grounds. There was considerable interchange of persons, boats, and apparatus between private and public areas in Washington and Oregon, but in the above table they are shown where they did the most work.

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COMPARATIVE STATISTICS OF THE OYSTER PRODUCT OF THE PACIFIC COAST STATES FOR VARIOUS YEARS FROM 1880 TO 1912.[a]

Years.	California.		Oregon.		Washington.		Total.	
	Bushels.	*Value.*	*Bushels.*	*Value.*	*Bushels.*	*Value.*	*Bushels.*	*Value.*
1880	(b)	(b)	(b)	(b)	15,000	$10,000	(b)	(b)
1888	130,000	$509,175	4,125	$6,250	60,993	86,574	195,118	$601,999
1889	146,150	571,525	1,666	3,125	125,790	128,604	273,606	703,254
1890	151,325	592,137	1,470	2,758	148,150	147,930	300,945	742,825
1891	158,130	618,455	1,622	3,043	166,428	154,961	326,180	776,459
1892	178,645	698,257	1,633	3,062	164,924	147,995	345,202	849,314
1895	163,636	539,497	1,480	2,220	108,067	109,232	273,183	650,949
1899	420,000	867,000	985	1,625	98,355	174,567	519,340	1,043,192
1904	188,613	628,023	992	1,488	191,208	402,012	380,813	1,031,523
1908	104,000	337,000	1,300	4,200	204,000	352,500	209,300	693,700
1912	68,037	280,344	2,213	9,050	143,329	386,849	213,579	676,243

[a] The statistics for 1908 in this table are from data published by the Bureau of the Census.
[b] Statistics not available.

VESSEL FISHERIES AT BOSTON AND GLOUCESTER.

Statistics of the vessel fisheries at Boston and Gloucester, Mass., have been collected and published as monthly and annual bulletins, giving the quantity and value of fishery products landed by American fishing vessels at each of these ports during the calendar year.

In 1912 there were landed at Boston 3,676 trips, amounting to 100,300,080 pounds of fish, valued at $2,731,391, and at Gloucester 3,973 trips, aggregating 82,403,979 pounds, valued at $2,047,868, a total of 7,649 trips and 182,704,059 pounds of fresh and salted fish, valued at $4,779,259. The receipts at Boston were all fresh fish except 143,000 pounds of salted mackerel, valued at $9,442, while at Gloucester they included 51,263,695 pounds of fresh fish, valued at $1,055,295 and 31,140,284 pounds of salted fish, valued at $992,573. Compared with 1911 there was an increase of 849 trips at the two ports, but a decrease of 2,449,308 pounds in the quantity and of $245,238 in the value of the products. The catch of cod and cusk did not vary materially from that of the previous year, but there was considerable decrease in the value. There was an increase in the catch of haddock and halibut, but a decrease in that of hake, pollock, mackerel, and other species. The dealers at Gloucester imported during the year 3,637,169 pounds of salted cod from Newfoundland and Nova Scotia.

Statistics of these fisheries are given in detail by months and fishing grounds in the following tables:

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Quantity and Value of Certain Fishery Products Landed at Boston and Gloucester, Mass., by American Fishing Vessels During the Year 1912, Shown by Months.

Month.	Number of trips.	Cod.				Cusk.				Haddock.			
		Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
LANDED AT BOSTON.		*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
January	192	765,550	$36,590	.....	.....	146,400	$4,594	.....	.....	1,997,300	$66,355	.....	.....
February	258	1,363,700	52,647	.....	.....	187,600	4,596	.....	.....	5,367,200	135,071	.....	.....
March	322	3,074,900	95,074	.....	.....	235,900	5,396	.....	.....	6,134,700	134,889	.....	.....
April	306	2,446,400	71,600	.....	.....	402,900	8,084	.....	.....	5,239,600	79,834	.....	.....
May	230	2,301,100	55,757	.....	.....	469,600	8,274	.....	.....	2,552,900	64,450	.....	.....
June	256	1,772,500	61,861	.....	.....	198,700	3,351	.....	.....	4,128,200	62,089	.....	.....
July	335	1,682,700	67,869	.....	.....	98,400	2,042	.....	.....	3,705,750	70,212	.....	.....
August	371	3,528,300	85,085	.....	.....	189,000	3,236	.....	.....	5,204,550	60,299	.....	.....
September	398	1,797,250	66,613	.....	.....	202,300	3,852	.....	.....	5,754,200	95,205	.....	.....
October	388	2,521,650	95,160	.....	.....	394,900	6,777	.....	.....	6,040,500	132,264	.....	.....
November	374	1,093,500	50,700	.....	.....	360,000	6,615	.....	.....	3,452,400	119,151	.....	.....
December	246	1,065,750	45,426	.....	.....	180,400	4,359	.....	.....	3,199,900	143,175	.....	.....
Total	3,676	23,413,300	784,382	.....	.....	3,066,100	61,176	.....	.....	52,777,200	1,162,994	.....	.....
LANDED AT GLOUCESTER.													
January	350	192,218	7,807	88,432	$4,873	17,830	359	1,255	$32	739,217	21,789	3,400	$55
February	278	164,890	7,040	729,010	33,490	6,131	134	2,141	53	428,674	10,783	6,295	93
March	436	2,184,545	50,319	255,566	12,317	34,981	570	5,185	130	1,960,361	45,459	5,124	77
April	428	1,734,089	34,924	635,597	23,195	282,988	4,153	4,005	100	3,991,868	51,751	10,665	161
May	265	1,705,416	31,167	1,571,494	54,256	613,064	8,373	2,235	57	354,842	6,828	24,290	339
June	189	2,078,995	34,640	4,144,695	130,172	344,197	4,475	11,755	294	278,617	1,988	47,495	623
July	229	979,990	16,486	2,250,260	72,913	502,038	6,517	54,388	1,227	638,490	4,482	60,643	807
August	202	1,303,920	22,037	2,302,621	73,217	619,988	8,049	33,219	746	687,870	4,815	46,265	581
September	189	838,450	14,803	1,883,938	61,519	467,229	5,942	22,145	497	632,790	4,938	50,370	688
October	147	615,767	12,176	1,821,846	72,971	238,270	3,114	10,755	248	462,306	5,528	34,589	533
November	592	127,385	3,109	2,314,617	98,606	77,057	1,000	9,880	223	96,970	2,978	21,695	327
December	668	179,855	8,561	188,232	9,053	47,295	615	6,406	158	175,585	8,535	11,610	174
Total	3,973	12,105,520	243,069	18,186,308	646,582	3,251,068	43,301	163,369	3,765	10,447,589	169,874	322,441	4,458
Grand total	7,649	35,518,820	1,027,451	18,186,308	646,582	6,317,168	104,477	163,369	3,765	63,224,789	1,332,868	322,441	4,458
Grounds E. of 66° west long.	741	10,838,253	269,819	14,988,605	521,029	2,602,783	41,444	75,041	1,728	6,110,770	140,993	156,409	2,177
Grounds W. of 66° west long.	6,908	24,680,567	757,632	3,197,703	125,553	3,714,385	63,033	88,328	2,037	57,114,019	1,191,875	166,032	2,281
Landed at Boston in 1911	3,971	21,704,300	714,514	.....	.....	2,916,800	61,058	.....	.....	47,687,300	1,126,744	.....	.....
Landed at Gloucester in 1911	2,829	12,272,843	279,974	19,729,034	886,490	3,516,702	60,596	248,018	6,221	8,024,102	131,128	463,774	8,550

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QUANTITY AND VALUE OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING THE YEAR 1912, SHOWN BY MONTHS—Continued.

Month.	Hake.				Pollock.				Halibut.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
LANDED AT BOSTON.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
January	296,800	$11,925			114,900	$4,146			14,900	$2,122		
February	302,250	12,465			169,150	6,223			56,700	6,360		
March	595,700	20,101			146,300	5,399			46,200	6,222		
April	475,500	9,733			164,700	4,306			91,350	11,255		
May	838,300	10,685			294,250	4,843			80,400	7,304		
June	951,100	14,394			274,800	6,970			80,630	7,380		
July	699,500	12,872			254,200	8,862			166,000	13,679		
August	552,900	8,838			501,800	9,689			90,545	8,090		
September	1,124,100	20,697			622,500	16,054			70,590	7,962		
October	3,118,200	40,128			954,550	19,039			107,650	12,832		
November	1,982,200	34,954			599,200	8,357			27,475	5,048		
December	445,000	16,750			169,680	3,095			13,950	2,602		
Total	11,381,550	213,542			4,266,030	96,983			846,390	90,846		
LANDED AT GLOUCESTER.												
January	58,015	1,636	5,230	$98	405,173	15,607	12,056	$182	46,992	6,431	382	$33
February	7,952	255	1,370	20	203,611	8,442	15,292	230	141,685	13,795	5,655	463
March	27,233	428	995	14	169,913	5,744	8,270	124	220,123	20,317	45	4
April	234,539	2,191	2,203	33	213,821	4,248	14,725	222	153,225	17,231	860	68
May	691,472	5,354	8,716	118	976,806	8,014	19,885	275	178,133	14,264	232	19
June	474,713	3,359	83,508	1,044	141,245	1,095	82,125	1,179	432,443	29,214	47,156	3,753
July	351,359	2,443	47,127	592	189,555	1,361	37,247	555	229,446	15,671	2,173	174
August	477,010	3,338	33,458	417	41,935	336	32,385	487	266,882	25,104	11,408	913
September	630,310	5,306	35,006	524	69,178	553	23,191	349	263,182	28,965	393,327	39,288
October	356,865	4,090	32,465	517	122,400	1,348	22,247	368	158,635	18,692	18,496	1,852
November	480,715	5,529	13,065	210	4,290,451	44,165	24,485	368	77,653	12,576	965	97
December	117,000	3,894	6,555	101	3,269,231	50,659	15,405	232	45,847	7,459	204	21
Total	3,907,183	37,823	269,698	3,688	10,093,319	141,572	307,313	4,571	2,214,246	209,719	480,903	46,685
Grand total	15,288,733	251,365	269,698	3,688	14,359,349	238,555	307,313	4,571	3,060,636	300,565	480,903	46,685
Grounds E. of 66° west longitude	3,345,860	51,869	241,540	3,301	459,335	9,864	145,667	2,175	2,262,611	214,490	479,439	46,560
Grounds W. of 66° west longitude	11,942,873	199,496	28,158	387	13,900,014	228,691	161,646	2,396	798,025	86,075	1,464	125
Landed at Boston in 1911	11,337,925	227,327			5,095,840	121,381			748,850	65,811		
Landed at Gloucester in 1911	6,759,243	77,118	355,418	6,167	9,651,178	119,580	878,946	15,899	2,341,928	198,767	410,967	35,171

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Month.	Mackerel.				Other fish.[a]				Total.				Grand total.	
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.			
LANDED AT BOSTON.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
January									3,335,850	$125,732			3,335,850	$125,732
February									7,446,600	217,362			7,446,600	217,362
March									10,233,700	267,081			10,233,700	267,081
April					6,100	$90			8,826,550	184,902			8,826,550	184,902
May									6,536,550	151,313			6,536,550	151,313
June	295,750	$29,564	40,600	$805	82,000	510			7,783,680	186,119	40,600	$805	7,824,280	186,924
July	241,595	21,892	2,000	110	1,014,350	93,370			7,862,495	290,798	2,000	110	7,864,495	290,908
August	378,275	20,272	4,600	1,896	637,100	49,840			11,082,470	245,339	4,600	1,896	11,087,070	247,235
September	1,547,175	72,994	95,800	6,631	159,300	19,036			11,277,415	302,413	95,800	6,631	11,373,215	309,044
October	8,400	665			3,040	549			13,148,890	307,414			13,148,890	307,414
November	25,425	3,109			8,000	135			7,548,200	228,069			7,548,200	228,069
December									5,074,680	215,407			5,074,680	215,407
Total	2,496,620	148,496	143,000	9,442	1,909,890	163,530			100,157,080	2,721,949	143,000	9,442	100,300,080	2,731,391
LANDED AT GLOUCESTER.														
January					4,387,500	131,625	4,119,128	$76,821	5,846,945	185,254	4,229,883	82,094	10,076,828	267,348
February					612,500	18,375	222,200	4,925	1,565,443	58,824	981,963	39,274	2,547,406	98,098
March									4,597,156	122,837	275,185	12,666	4,872,341	135,503
April					54,000	1,080			6,664,530	115,578	668,055	23,779	7,332,585	139,357
May							54,200	1,121	4,519,733	74,000	1,681,052	56,185	6,200,785	130,185
June	12,060	944	368,000	20,240	749,000	9,408	107,600	2,556	4,511,270	85,123	4,892,334	159,361	9,403,604	244,984
July	82,080	4,503	10,000	450	791,720	8,214			3,764,678	59,677	2,461,838	76,718	6,226,516	136,395
August	23,590	778	42,600	2,386	1,050,630	10,678	7,000	210	4,471,815	75,135	2,508,956	78,967	6,980,771	154,092
September	7,290	622	693,600	52,573	854,800	4,727			3,763,229	65,856	3,101,577	155,438	6,864,806	221,294
October	21,510	1,299	262,600	22,386	40,000	450			2,015,752	46,697	2,202,998	98,875	4,218,750	145,572
November	17,100	1,244	28,200	2,975	16,000	240	320,308	5,819	5,183,331	70,841	2,733,215	108,625	7,916,546	179,466
December					525,000	15,750	5,174,816	90,362	4,359,813	95,473	5,403,228	100,101	9,763,041	195,574
Total	163,620	9,390	1,405,000	101,010	9,081,150	200,547	10,005,252	181,814	51,263,695	1,055,295	31,140,284	992,573	82,403,979	2,047,868
Grand total	2,660,240	157,886	1,548,000	110,452	10,991,040	364,077	10,005,252	181,814	151,420,775	3,777,244	31,283,284	1,002,015	182,704,059	4,779,259
Grounds E. of 66° west longitude	123,000	18,191	450,200	25,432	5,647,540	180,353	9,998,252	181,604	31,390,152	927,023	26,535,153	784,006	57,925,305	1,711,029
Grounds W. of 66° west longitude	2,537,240	139,695	1,097,800	85,020	5,343,500	183,724	7,000	210	120,030,623	2,850,221	4,748,131	218,009	124,778,754	3,068,230
Landed at Boston in 1911	2,588,694	142,114	131,200	9,755	1,549,200	106,578			93,628,909	2,565,527	131,200	9,755	93,760,109	2,575,282
Landed at Gloucester in 1911	510,140	30,132	1,307,900	101,886	8,159,545	186,567	16,763,520	304,979	51,235,681	1,083,862	40,157,577	1,365,353	91,393,258	2,449,215

[a] Includes herring from Newfoundland—5,525,000 pounds frozen, $165,750, and 9,998,252 pounds salted, $181,604.

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QUANTITY AND VALUE OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING THE YEAR 1912, SHOWN BY FISHING GROUNDS.

Fishing grounds.	Number of trips.	Cod.				Cusk.				Haddock.			
		Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
LANDED AT BOSTON.													
East of 66° west longitude.		*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
La Have Bank	16	261,000	$7,125			48,500	$895			682,600	$10,452		
Western Bank	22	699,100	21,535			38,000	936			126,000	1,950		
Quereau Bank	15	280,800	9,184			13,400	261			7,000	134		
Cape Shore	217	3,276,500	118,812			802,100	16,919			3,829,700	108,883		
West of 66° west longitude.													
Browns Bank	84	755,000	23,868			370,500	7,021			1,850,000	33,084		
Georges Bank	564	7,420,200	210,749			303,000	6,260			15,286,700	306,683		
Cashes Bank	8	28,400	807			81,200	1,226			7,000	194		
Clark Bank	5	67,700	2,098			2,800	43			131,000	1,515		
Fippenies Bank	1	2,000	100			4,000	120			2,000	100		
Middle Bank	371	526,300	21,903			188,700	3,968			1,843,300	64,339		
Jeffreys Ledge	374	574,250	24,700			326,700	6,387			1,196,050	43,733		
South Channel	868	5,837,150	211,694			310,400	6,033			22,923,400	459,033		
Nantucket Shoals	35	422,000	13,554			2,900	58			107,800	1,719		
Off Highland Light	11	11,000	494			4,600	118			155,400	5,249		
Off Chatham	244	929,550	32,030			39,800	758			3,441,600	84,636		
Shore, general	841	2,322,350	85,734			529,500	10,173			1,188,650	41,290		
Total	3,676	23,413,300	784,382			3,066,100	61,176			52,777,200	1,162,994		
LANDED AT GLOUCESTER.													
East of 66° west longitude.													
La Have Bank	54	913,726	18,076	75,822	$2,765	555,800	7,442	4,049	$93	613,055	6,020	815	$11
Western Bank	57	1,361,230	23,947	1,391,980	44,996	402,458	5,221	22,770	515	87,640	675	43,225	625
Quereau Bank	109	2,314,063	38,092	4,180,422	132,691	138,725	1,818	20,167	477	80,160	564	37,850	508
Green Bank	3			17,180	745			375	8				
Grand Bank	17	350,365	6,043	1,560,171	55,014	250	3					4,335	60
St. Peters Bank	5	8,885	155	723,835	22,187							2,220	28
Bacalieu Bank	1			20,965	749			55	1				
Off Newfoundland	74			2,812,146	103,767							29,857	392
Cape North	10	555,545	9,398	887,851	27,296	1,990	26	760	19	2,165	16	3,075	42
Cape Shore	97	618,031	13,798	238,003	9,557	555,830	7,329	26,025	596	677,005	12,243	1,790	26
Gulf of St. Lawrence	23	76,845	1,263	1,863,420	71,779	2,730	35	840	19			19,690	279
Greenland	1												

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St. Anns Bank	8	83,428	1,647	602,260	27,895	2,200	29			2,640	29	13,552	206
The Gully	5	38,735	744	25,910	1,120	40,800	530			2,805	27		
Labrador Coast	7			498,640	20,468								
West of 66° west longitude.													
Browns Bank	111	1,899,492	35,896	521,243	19,518	1,079,630	14,442	19,971	453	1,896,236	14,634	41,005	586
Georges Bank	268	2,778,632	56,855	2,663,170	105,454	312,981	4,166	68,357	1,584	3,253,537	37,098	124,902	1,693
Cashes Bank	5	21,095	392			53,715	733			350	2		
Middle Bank	25												
South Channel	27	420,957	8,538			21,475	278			670,560	8,156		
Nantucket Shoals	59	8,245	137							100	1		
Shore, general	3,007	656,246	28,088	13,290	581	82,484	1,249			3,161,336	90,409	125	2
Total	3,973	12,105,520	243,069	18,186,308	646,582	3,251,068	43,301	163,369	3,765	10,447,589	169,874	322,441	4,458
Grand total	7,649	35,518,820	1,027,451	18,186,308	646,582	6,317,168	104,477	163,369	3,765	63,224,789	1,332,868	322,441	4,458

Fishing grounds.	Hake.				Pollock.				Halibut.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
LANDED AT BOSTON.												
East of 66° west longitude.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
La Have Bank	76,000	$1,495			4,700	$120			44,700	$4,371		
Western Bank	38,000	595			69,000	2,498			171,700	17,127		
Quereau Bank	6,000	90							110,400	8,583		
Cape Shore	1,274,300	32,832			210,130	5,761			154,400	18,258		
West of 66° west longitude.												
Browns Bank	222,400	5,666			99,400	2,498			74,150	9,849		
Georges Bank	545,100	8,921			282,200	6,490			165,500	17,125		
Cashes Bank	255,000	4,055			6,500	138			2,000	180		
Clark Bank	21,300	316			3,800	101			1,700	149		
Fippenies Bank	6,000	300										
Middle Bank	1,034,500	26,165			189,800	5,008			6,200	933		
Jeffreys Ledge	1,153,400	25,791			888,400	20,991			14,185	1,213		
South Channel	4,325,700	66,295			603,000	14,227			84,475	11,164		
Nantucket Shoals	8,100	154			77,400	2,254			1,600	123		
Off Highland Light	14,100	638			6,300	231			200	24		
Off Chatham	304,400	7,741			162,900	4,246			5,600	673		
Shore, general	2,097,250	32,488			1,657,500	32,420			9,580	1,074		
Total	11,381,550	213,542			4,266,030	96,983			846,390	90,846		

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QUANTITY AND VALUE OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING THE YEAR 1912, SHOWN BY FISHING GROUNDS—Continued.

Fishing grounds.	Hake.				Pollock.				Halibut.			
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
LANDED AT GLOUCESTER.												
East of 66° west longitude.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
La Have Bank	554,648	$4,395	16,092	$208	62,455	$504	3,500	$54	132,700	$12,418	.....	.....
Western Bank	421,325	3,553	45,105	598	49,225	397	31,685	457	365,318	30,054	8,987	$724
Quereau Bank	340,762	2,683	86,699	1,182	22,150	215	56,922	850	627,432	55,516	24,121	1,977
Green Bank	19,560	230	1,785	27	.....	.....	540	9	58,583	8,615	.....	.....
Grand Bank	21,270	149	7,410	94	.....	.....	5,830	98	90,210	7,526	4,362	373
St. Peters Bank	.....	.....	15,970	199	.....	.....	7,450	111	.....	.....	2,148	172
Bacalieu Bank	3,000	36	3,740	65	.....	.....	.....	.....	15,500	1,163	2,185	219
Off Newfoundland	.....	.....	7,368	100	.....	.....	6,095	92	.....	.....	2,470	208
Cape North	20,950	147	17,660	221	995	8	10,260	141	28,270	2,323	2,982	239
Cape Shore	512,620	5,098	20,068	309	39,335	350	7,485	115	220,227	27,893	145	11
Gulf of St. Lawrence	11,130	78	9,248	121	240	2	10,560	160	146,911	9,644	27,762	2,207
Greenland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,885	1,389
St. Anns Bank	.....	.....	5,995	94	290	2	5,140	85	.....	.....	1,340	135
The Gully	46,295	488	4,400	83	815	7	200	3	96,260	10,999	.....	.....
Labrador Coast	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	389,052	38,906
West of 66° west longitude.												
Browns Bank	1,007,166	7,559	17,213	232	86,671	692	33,553	504	41,678	3,836	950	78
Georges Bank	152,837	1,330	10,770	152	53,498	460	126,962	1,875	390,641	39,644	514	47
Cashes Bank	50,295	387	.....	.....	3,780	31	.....	.....	.....	.....	.....	.....
Middle Bank	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Channel	150,135	1,715	.....	.....	14,185	115	.....	.....	.....	.....	.....	.....
Nantucket Shoals	.....	.....	.....	.....	542,740	4,107	.....	.....	.....	.....	.....	.....
Shore, general	595,190	9,975	175	3	9,216,940	134,682	1,131	17	516	88	.....	.....
Total	3,907,183	37,823	269,698	3,688	10,093,319	141,572	307,313	4,571	2,214,246	209,719	480,903	46,685
Grand total	15,288,733	251,365	269,698	3,688	14,359,349	238,555	307,313	4,571	3,060,636	300,565	480,903	46,685

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Fishing grounds.	Mackerel.				Other fish.				Total.				Grand total.	
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.			
LANDED AT BOSTON.														
East of 66° west longitude.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
La Have Bank									1,117,500	$24,458			1,117,500	$24,458
Western Bank					2,600	$208			1,144,400	44,849			1,144,400	44,849
Quereau Bank									417,600	18,252			417,600	18,252
Cape Shore	117,600	$17,795	40,600	$805	119,940	14,395			9,784,670	333,655	40,600	$805	9,825,270	334,460
West of 66° west longitude.														
Browns Bank					15,000	1,632			3,386,450	83,618			3,386,450	83,618
Georges Bank	20,400	2,040			1,440,050	125,024			25,463,150	683,292			25,463,150	683,292
Cashes Bank					14,400	1,728			394,500	8,328			394,500	8,328
Clark Bank									228,300	4,217			228,300	4,217
Fippenies Bank									14,000	620			14,000	620
Middle Bank	207,500	10,231	1,800	96					3,996,300	132,547	1,800	96	3,998,100	132,643
Jeffreys Ledge					15,100	1,561			4,167,085	124,376			4,167,085	124,376
South Channel					[a] 21,600	1,927			34,110,725	770,373			34,110,725	770,373
Nantucket Shoals	900	24			[b] 40,500	360			661,200	18,246			661,200	18,246
Off Highland Light									191,600	6,754			191,600	6,754
Off Chatham	717,175	44,966	32,800	3,972					5,601,025	175,050	32,800	3,972	5,633,825	179,022
Shore, general	1,433,045	73,440	67,800	4,569	[c] 240,700	16,695			9,478,575	293,314	67,800	4,509	9,546,375	297,883
Total	2,496,620	148,496	143,000	9,442	1,909,890	163,530			100,157,080	2,721,949	143,000	9,442	100,300,080	2,731,391
LANDED AT GLOUCESTER.														
East of 66° west longitude.														
La Have Bank									2,832,384	48,855	100,278	3,131	2,932,662	51,986
Western Bank									2,687,196	63,847	1,543,752	47,915	4,230,948	111,762
Quereau Bank									3,523,292	98,888	4,406,181	137,685	7,929,473	236,573
Green Bank									78,143	8,845	19,880	789	98,023	9,634
Grand Bank									462,095	13,721	1,582,108	55,639	2,044,203	69,360
St. Peters Bank									8,885	155	751,623	22,697	760,508	22,852
Bacalieu Bank									18,500	1,199	26,945	1,034	45,445	2,233
Off Newfoundland					[d] 5,525,000	165,750	[d] 9,998,252	$181,604	5,525,000	165,750	12,856,188	286,163	18,381,188	451,913
Cape North									609,915	11,918	922,588	27,958	1,532,503	39,876
Cape Shore	5,400	396	394,600	23,127					2,628,448	67,107	688,116	33,741	3,316,564	100,848

[a] Butterfish, 6,500 pounds, value $325; and swordfish, 15,100 pounds, value $1,602.
[b] Menhaden, 40,000 pounds, value $300; and swordfish, 500 pounds, value $60.
[c] Herring, 14,100 pounds, value $225; menhaden, 42,000 pounds, value $210; and swordfish, 184,600 pounds, value $16,260.
[d] Herring.

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QUANTITY AND VALUE OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING THE YEAR 1912, SHOWN BY FISHING GROUNDS—Continued.

Fishing grounds.	Mackerel.				Other fish.				Total.				Grand total.	
	Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.			
LANDED AT GLOUCESTER—con.														
East of 66° west longitude—Con.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
Gulf of St. Lawrence	.....	.....	15,000	$1,500	.....	.....	.....	.....	237,856	$11,022	1,946,520	$76,065	2,184,376	$87,087
Greenland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,885	1,389	13,885	1,389
St. Anns Bank	.....	.....	.....	.....	.....	.....	.....	.....	88,558	1,707	718,287	28,415	806,845	30,122
The Gully	.....	.....	.....	.....	.....	.....	.....	.....	225,710	12,795	30,510	1,206	256,220	14,001
Labrador Coast	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	887,692	59,374	887,692	59,374
West of 66° west longitude.														
Browns Bank	.....	.....	.....	.....	920	$92	.....	.....	6,011,793	77,151	633,935	21,371	6,645,728	98,522
Georges Bank	.....	.....	.....	.....	[a] 44,000	718	.....	.....	6,986,126	140,271	2,994,675	110,805	9,980,801	251,076
Cashes Bank	.....	.....	.....	.....	.....	.....	.....	.....	129,235	1,545	.....	.....	129,235	1,545
Middle Bank	80,820	$3,522	23,000	1,088	.....	.....	[b] 7,000	$210	80,820	3,522	30,000	1,298	110,820	4,820
South Channel	.....	.....	.....	.....	.....	.....	.....	.....	1,277,312	18,802	.....	.....	1,277,312	18,802
Nantucket Shoals	8,460	737	918,600	70,798	.....	.....	.....	.....	559,545	4,982	918,600	70,798	1,478,145	75,780
Shore, general	68,940	4,735	53,800	4,497	[c] 3,511,230	33,987	.....	.....	17,292,882	303,213	68,521	5,100	17,361,403	308,313
Total	163,620	9,390	1,405,000	101,010	9,081,150	200,547	10,005,252	181,814	51,263,695	1,055,295	31,140,284	992,573	82,403,979	2,047,868
Grand total	2,660,240	157,886	1,548,000	110,452	10,991,040	364,077	10,005,252	181,814	151,420,775	3,777,244	31,283,284	1,002,015	182,704,059	4,779,259

[a] Shad.
[b] Herring.
[c] Bluebacks, 2,355,200 pounds, value $21,213; butterfish, 1,200 pounds, value $48; herring, 345,600 pounds, value $5,243; menhaden, 439,200 pounds, value $2,278; shad, 368,400 pounds, value $5,068; and swordfish, 1,630 pounds, value $137. All other items under "Other fish" are swordfish.

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Approximately two-thirds of the fishery products landed at Boston and Gloucester, Mass., by American fishing vessels during the year, or 68.29 per cent of the quantity and 64.20 per cent of the value, were from fishing grounds lying directly off the coast of the United States; 11.67 per cent of the quantity and 11.63 per cent of the value from grounds off the coast of Newfoundland; 19.53 per cent of the quantity and 22.89 per cent of the value from grounds off the Canadian Provinces; and less than 1 per cent of the quantity and 1.27 per cent of the value from the coasts of Greenland and Labrador. Newfoundland herring constituted 8.49 per cent of the quantity and 7.26 per cent of the value of the products of the vessel fisheries of these ports. The herring were taken on the treaty coast of Newfoundland, but cod and other species from that region were obtained chiefly from fishing banks on the high seas. The fish caught by American fishing vessels off the Canadian Provinces were all from offshore fishing grounds. The catch from each of these fishing regions is given in detail in the following table:

QUANTITY AND VALUE OF FISH LANDED BY AMERICAN FISHING VESSELS AT BOSTON AND GLOUCESTER, MASS., IN 1912, FROM GROUNDS OFF THE COASTS OF THE UNITED STATES, NEWFOUNDLAND, AND CANADIAN PROVINCES.

Species.	United States.		Newfoundland.[a]		Canadian Provinces.		Total.	
	Pounds.	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
Cod:								
Fresh....	24,680,567	$757,632	359,250	$6,198	10,479,003	$263,621	35,518,820	$1,027,451
Salted ...	3,197,703	125,553	5,632,937	202,930	9,355,668	318,099	18,186,308	646,582
Cusk:								
Fresh....	3,714,385	63,033	250	3	2,602,533	41,441	6,317,168	104,477
Salted ...	88,328	2,037	430	9	74,611	1,719	163,369	3,765
Haddock:								
Fresh....	57,114,019	1,191,875	.....	.....	6,110,770	140,993	63,224,789	1,332,868
Salted....	166,032	2,281	36,412	480	119,997	1,697	322,441	4,458
Hake:								
Fresh....	11,942,873	199,496	43,830	415	3,302,030	51,454	15,288,733	251,365
Salted....	28,158	387	36,273	485	205,267	2,816	269,698	3,688
Pollock:								
Fresh....	13,900,014	228,691	.....	.....	459,335	9,864	14,359,349	238,555
Salted....	161,646	2,396	19,915	310	125,752	1,865	307,313	4,571
Halibut:								
Fresh....	798,025	86,075	164,293	17,304	2,098,318	197,186	3,060,636	300,565
Salted....	1,464	125	414,102	41,267	65,337	5,293	480,903	46,685
Mackerel:								
Fresh....	2,537,240	139,695	.....	.....	123,000	18,191	2,660,240	157,886
Salted....	1,097,800	85,020	.....	.....	450,200	25,432	1,548,000	110,452
Herring:								
Fresh....	359,700	5,468	5,525,000	165,750	.....	.....	5,884,700	171,218
Salted....	7,000	210	9,998,252	181,604	.....	.....	10,005,252	181,814
Swordfish:								
Fresh....	1,687,300	148,096	.....	.....	122,540	14,603	1,809,840	162,699
Other fish:								
Fresh....	3,296,500	30,160	.....	.....	.....	.....	3,296,500	30,160
Total...	124,778,754	3,068,230	22,230,944	616,755	35,694,361	1,094,274	182,704,059	4,779,259

[a] Includes 13,885 pounds of salted halibut, valued at $1,389, from Greenland; and 498,640 pounds of salted cod, valued at $20,468; and 389,052 pounds of salted halibut, valued at $38,906, from the Labrador coast.

The mackerel fishery continues to be unsuccessful. The catch of mackerel in New England in 1912 amounted to 31,861 barrels fresh and 8,267 barrels salted, as against 43,541 barrels fresh and 6,633 barrels salted in the previous year. The quantity landed at Boston during the year was 2,496,620 pounds fresh, valued at $148,496, and 143,000 pounds salted, valued at $9,442; and at Gloucester 163,620 pounds fresh, valued at $9,390, and 1,405,000 pounds salted, valued at $101,010. In 1913 to July 1 the catch of fresh mackerel was 22,837 barrels and of salted mackerel 1,523 barrels, the quantity of fresh

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mackerel being about double that for the same period in 1912. The mackerel fishery on the southern grounds in the spring of 1913 was a failure owing to scarcity of fish. The dogfish, however, were not so troublesome to the netters as in recent previous years. The catch on the Cape Shore was quite successful, although the fleet was late in getting to that ground.

The Newfoundland herring fishery, during the season of 1912–13, was engaged in by 42 American vessels, 6 of which made second trips. The catch amounted to 47,184 barrels, or 10,511,468 pounds, of salted herring, and 10,609 barrels, or 2,652,308 pounds, of frozen herring. The fish were obtained from Bay of Islands and Bonne Bay, 22 trips being from the former and 26 from the latter locality. There was a large decrease in the catch of both salted and frozen herring as compared with the previous season.

An event of great importance to the local fisheries and also to the wide extent of territory contributing to and supplied by the fishing industry of Boston is the construction of the new fish wharf at South Boston. No expense has been spared to make this the best equipped dock for handling fish in the United States. The wharf facilities will be extensive, affording accommodations for 40 vessels to discharge fish at one time, and by lying two abreast, as is frequently done at T Wharf, 80 vessels can discharge their cargoes. Boston has long needed better facilities for handling its fish supply than those at T Wharf, the accommodations there being cramped and congested for both dealers and fishermen. Under such conditions it is hardly possible to handle fish in the most sanitary manner. The new dock will be equipped with every known device for the proper care of fish from the time they leave the vessel until they are ready for shipment.

OTTER-TRAWL FISHERY.

The otter-trawl fishery at Boston, which began with one steamer in 1905, has gradually grown to a fishery of considerable importance, and in 1912, and up to July 1, 1913, was participated in by six specially constructed steamers. These are owned and operated by a company at Boston, no other firm having engaged in this method of fishing in New England. An otter trawler from New York also landed fish at Boston for several months in 1912.

The introduction of this method of fishing has greatly disturbed New England vessel owners and line fishermen in general, it being claimed by them that if continued any great length of time on a large scale the fishing grounds will eventually be destroyed. On the other hand, those using or advocating the use of otter trawls in the capture of ground fish assert that this apparatus is no more destructive to fish or injurious to the fishing grounds than other forms of fishing gear now employed in the various branches of the fishing industry.

In the calendar year 1912 the otter-trawl fleet landed at Boston over 16,000,000 pounds of fish, of which nearly 14,000,000 pounds were haddock. It is probable that in 1913 this amount will be exceeded by several million pounds.

This fleet of vessels has confined its fishing chiefly to Georges Bank and adjacent grounds. In March, however, owing to the scarcity of fish on Georges, a portion of the fleet fished on Western Bank, which was the first time since this method of fishing was introduced

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in New England that vessels operating otter trawls have operated on other fishing grounds than Georges. Several trips were made to Western Bank, after which the entire fleet repaired to Georges and the South Channel, shifting from one ground to the other according to the abundance or scarcity of fish found. At times the otter trawlers have landed a part of their catch of haddock at Portland, Me., for canning purposes.

This fishery has been under constant investigation by the Bureau for the purpose of determining, among other things, the extent of the destruction of immature fish, which is an unavoidable feature of this method, varying with the grounds and the season. Agents of the Bureau have been placed on the trawling vessels in order to obtain information as to the composition of each haul of the net, and a vast amount of data has thus been secured. It is expected that the inquiry will be practically completed by the end of the calendar year 1913, and a report will then be prepared as soon as practicable giving the results of the inquiry and containing recommendations, as required by Congress. The work of the Bureau has been facilitated by the owners of the trawling fleet, who have made no objection to the presence of the agents on board any or all of the vessels.

GILL-NET FISHING FOR COD AND HADDOCK.

The style of gill nets used on the Great Lakes was introduced into New England fisheries about three years ago. The first year a few vessels or power boats were brought by lake fishermen for the purpose of testing the fishing grounds in the vicinity of Cape Ann. The result of the experiment was very satisfactory, and the following year, 1911, about 20 vessels were employed, a number of which were Gloucester vessels, manned by fishermen from that port. In the winter of 1912 a number of captains, who had generally followed the haddock fishery in winter, engaged in net fishing, which increased the netting fleet to 38 vessels. Few fish were taken by this method that year during the winter months, and not until early spring were any considerable quantities caught, and only a portion of the fleet realized enough profit on their catch to pay for the gear purchased. In the early inception of this method of fishing only grounds in the immediate vicinity of Cape Ann were resorted to, but during the past season scarcely any fish were caught close inshore, and the fleet was compelled to seek fishing banks lying from 8 to 12 miles offshore.

About 20 years ago cod gill-net fishing was extensively carried on in Ipswich Bay and on other local grounds, but in recent years, owing to the scarcity of fish on those grounds, only a small number of vessels have employed gill nets for the capture of cod. The difference between cod gill nets and the nets introduced by lake fishermen is chiefly in the manner in which they are set and hauled, size of mesh, and kind of floats and sinkers used. Cod gill nets are 35 fathoms long, from 6 to 8 feet deep, and the size of mesh is 9½ and 10 inches. Large glass globes attached at regular intervals along the head rope serve as floats. On the footrope opposite each globe is attached a brick. The buoyancy of the floats combined with the weight of the bricks keeps the nets perpendicular in the water. They are set and hauled from dories.

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The nets introduced by the lake fishermen are 50 fathoms long, from 6 to 8 feet deep, and the size of mesh is 6 and 6½ inches. The twine generally used is linen, although cotton twine is now employed to some extent. The floats are of wood and aluminum. To keep the net in an upright position when set a lead sinker is attached to the foot line opposite each float. These nets, like cod nets, are set at and near the bottom, but instead of being set from dories they are payed out over the stern from boxes while the vessel is going at slow speed. A box contains 4 nets of 50 fathoms each, and 12 boxes of nets constitute a string. The number of boxes set at one time depends upon the condition of the weather. The nets are hauled by a lifter, sometimes called an "iron man," rigged on the port side just aft of the wheelhouse. A separate engine is used for operating the lifter. The fish, on coming to the surface, are taken from the nets and placed in boxes. Each vessel or boat has three strings of nets. The weather permitting, one string is in the water, one on the vessel ready to set as soon as a haul has been made, and another on the wharf undergoing repairs, no mending being done on the vessel. Haddock is the principal species taken, but cod and pollock are also obtained in considerable quantities.

PACIFIC COAST FISHERIES.

The salmon fisheries of the Pacific coast were in a prosperous condition in 1912, but the pack of canned salmon was slightly smaller than in the previous year, although there was a large increase in the pack in Alaska. The year was not a prosperous one for the purse-seine fishery for salmon on Puget Sound. Compared with the previous year, however, there was an increase from 136 to 170 in the number of purse-seine boats employed in this fishery. The halibut catch in 1912 varied but little from that of the previous year, being about 35,000,000 pounds. The product in 1912 was reported to have been marketed at higher prices on the average than in 1911. The cod fishery was carried on by 7 firms having 13 vessels, 8 of which sailed from San Francisco and 5 from Puget Sound ports, and the catch for the year amounted to about 9,300,000 pounds.

The work of collecting statistics of the quantity and value of fishery products landed at Seattle, Wash., by American fishing vessels and boats, and also by freight steamers, was begun about the middle of February, 1912. The only fish reported to have been landed that month, after this work began, was 629,625 pounds of fresh halibut from Flattery Bank, valued at $27,773. An interruption in the work occurred early in July on account of the resignation of the local agent at Seattle, and consequently the returns for July and August are incomplete. The work was resumed early in August and continued to the end of April the following year.

The principal species of fish landed at Seattle during the period covered by the returns were halibut, herring, and salmon. Black cod, cod, and various other species were also landed in considerable quantities. The products were obtained chiefly from Alaska, Flattery Bank, and Puget Sound. Statistics of the quantity and value of fishery products landed at this port, so far as available, are given by months from March to December, 1912, and from January to April, 1913, in the following tables:

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QUANTITY AND VALUE OF CERTAIN FISHERY PRODUCTS LANDED AT SEATTLE, WASH., BY AMERICAN FISHING VESSELS AND BOATS, AND FREIGHT STEAMERS, FROM MARCH, 1912, TO APRIL, 1913.

Month.*	Number of trips.	Black cod.				Cod.				Halibut.				Herring.			
		Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.		Fresh.		Salted.	
1912.		*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
March	78	.....	.....	.....	.....	.....	.....	.....	.....	2,931,919	$152,331	.....	.....	.....	.....	.....	.....
April	91	.....	.....	.....	.....	.....	.....	.....	.....	3,940,289	165,569	.....	.....	.....	.....	.....	.....
May	93	.....	.....	.....	.....	.....	.....	.....	.....	3,685,635	104,497	.....	.....	.....	.....	.....	.....
June	86	40,000	$1,135	.....	.....	.....	.....	.....	.....	3,296,000	152,312	.....	.....	.....	.....	.....	.....
July	16	.....	.....	.....	.....	.....	.....	.....	.....	1,086,000	38,520	.....	.....	.....	.....	.....	.....
August	86	39,065	1,095	.....	.....	28,195	$1,300	100	$5	3,062,995	143,774	.....	.....	2,400	$120	.....	.....
September	110	15,095	2,490	400	$20	3,825	135	704,000	18,325	2,950,930	139,090	.....	.....	.....	.....	125,100	$4,255
October	78	2,200	110	.....	.....	.....	.....	9,300	480	2,681,430	167,080	16,800	$855	.....	.....	224,125	7,615
November	104	2,255	105	7,700	280	.....	.....	.....	.....	2,310,045	145,045	.....	.....	23,520	596	2,085,390	35,875
December	76	1,500	70	6,510	275	.....	.....	15,000	375	1,073,935	65,000	35,690	1,070	.....	.....	5,231,450	134,129
Total	818	100,115	5,005	14,610	575	32,020	1,435	728,400	19,185	27,019,178	1,273,818	52,490	1,925	25,920	716	7,666,065	181,874
1913.																	
January	78	9,100	364	8,600	430	.....	.....	.....	.....	763,810	60,079	200	10	21,180	191	3,488,450	48,257
February	66	11,835	407	200	15	.....	.....	.....	.....	2,236,390	173,028	.....	.....	512,100	4,029	73,975	1,156
March	94	31,380	1,345	700	53	.....	.....	.....	.....	3,568,560	241,274	.....	.....	722,220	3,277	3,500	175
April	97	21,440	712	600	30	.....	.....	.....	.....	2,777,055	186,883	.....	.....	195,200	895	10,900	477
Total	335	73,755	2,828	10,100	528	.....	.....	.....	.....	9,345,815	661,264	200	10	1,450,700	8,392	3,576,825	50,065

* Statistics from March to July, inclusive, include fish landed at Tacoma.

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QUANTITY AND VALUE OF CERTAIN FISHERY PRODUCTS LANDED AT SEATTLE, WASH., BY AMERICAN FISHING VESSELS AND BOATS, AND FREIGHT STEAMERS, FROM MARCH, 1912, TO APRIL, 1913—Continued.

Month.[a]	Salmon.										Other fish, fresh.		Total.			
	Coho, or silver.		Dog, or chum.		Humpback, or pink.		King, or spring.		Sockeye, or red.				Fresh.		Salted.	
1912.	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*	*Pounds.*	*Value.*
March	.....	.....	.....	.....	.....	.....	18,000	$2,025	.....	.....	.....	.....	2,949,919	$154,356	.....	.....
April	.....	.....	.....	.....	.....	.....	264,900	27,519	.....	.....	.....	.....	4,205,189	193,088	.....	.....
May	.....	.....	.....	.....	.....	.....	237,300	20,760	.....	.....	.....	.....	3,922,935	125,257	.....	.....
June	.....	.....	.....	.....	.....	.....	544,700	59,423	.....	.....	15,000	$600	3,895,700	213,470	.....	.....
July	8,000	$400	11,000	$550	.....	.....	428,400	35,176	.....	.....	13,500	540	1,546,900	75,186	.....	.....
August	176,820	10,370	1,001,144	58,098	6,017,038	$438,388	399,651	31,447	1,580,912	$192,612	129,310	3,492	12,437,530	880,696	100	$5
September	942,890	68,645	4,711,346	242,166	4,640,195	247,625	679,080	50,060	6,143,740	660,515	117,285	5,635	20,204,386	1,416,361	829,500	22,600
October	675,250	26,665	470,955	5,385	.....	.....	53,425	3,130	.....	.....	26,440	1,645	3,909,700	204,015	250,225	8,950
November	308,955	10,760	911,470	10,300	.....	.....	9,270	625	.....	.....	97,435	4,480	3,662,950	171,911	2,093,090	36,155
December	5,000	265	130,730	3,935	.....	.....	3,225	265	.....	.....	185,595	11,705	1,399,985	81,840	5,288,650	135,849
Total	2,116,915	117,105	7,236,645	320,434	10,657,233	686,013	2,637,951	230,430	7,724,652	853,127	584,565	28,097	58,135,194	3,516,180	8,461,565	203,559
1913.																
January	350	25	76,705	2,165	.....	.....	16,770	1,418	.....	.....	143,055	10,159	1,030,970	74,401	3,497,250	48,697
February	.....	.....	.....	.....	.....	.....	19,345	2,227	.....	.....	159,910	11,561	2,939,580	191,252	74,175	1,171
March	.....	.....	3,500	350	.....	.....	15,910	1,693	590	25	240,610	18,290	4,582,770	266,254	4,200	228
April	.....	.....	.....	.....	.....	.....	140,040	12,364	5,700	435	160,515	9,881	3,299,950	211,170	11,500	507
Total	350	25	80,205	2,515	.....	.....	192,065	17,702	6,290	460	704,090	49,891	11,853,270	743,077	3,587,125	50,603

[a] Statistics from March to July, inclusive, include fish landed at Tacoma.

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SHAD AND HERRING FISHERIES OF CHESAPEAKE BAY.

Inquiries conducted by the Bureau show that the spring fishing season of 1913 was the poorest in many years in most parts of the Chesapeake Basin, and the aggregate catch of the principal spring fish—shad and herring—much less than in recent years. The effects of the diminished run of fish will be seen from three to five years hence, when the reduced progeny of the 1913 season's supply comes back to spawn.

The conditions in the Potomac River, which may be taken as typical for all the major streams, were in some respects the worst in 40 years. The upper reaches of the river were almost barren of fish during the entire season, and nearly all the shad and herring fishermen failed to meet expenses. At Ferry Landing, Va., the largest seine on the river, 1,200 fathoms long, discontinued operations in the middle of the season owing to the scarcity of fish. In former years this celebrated fishing shore, with a smaller seine, sometimes yielded 200,000 or more herring at a haul, and up to 10 or 15 years ago took probably 15,000 to 30,000 fish at a haul on an average. Only a few years back from 1,000 to 1,500 shad were frequently taken at one set of the seine. In 1913 the largest haul was 3,000 herring and 100 shad, while many times only 6 to 20 shad were taken.

The shad hatcheries operated by the Bureau on the Potomac and Susquehanna Rivers had a very unsuccessful season. Their operations afford a good criterion of the condition of the fishery in the fresh waters, because the whole field is covered and nearly every ripe fish that is caught by the fishermen is stripped of its eggs by spawn takers sent out from the hatcheries.

Shad culture on a scale that is entirely feasible can, with minor protective legislation, maintain the shad fishery in almost any stream, but shad culture under existing conditions is deprived of one very essential requirement, namely, an adequate supply of ripe eggs for hatching purposes.

The immediate cause of the failure of the shad and herring fisheries in 1913 is the diminished run of spawning fish into Chesapeake Bay from the sea and the enormous quantity of apparatus among which a limited catch had to be divided. Inasmuch as the great bulk of the yield is taken in salt water, the remnant that was able to reach the spawning grounds in the streams was insignificant and wholly inadequate to maintain the supply.

The remote cause of the present condition is excessive fishing in former years and the lack of even the minimum amount of protection that is demanded by regard for the most elementary principles of fishery conservation. Fish entering Chesapeake Bay have to run through such a maze of nets that the wonder is that any are able to reach their spawning grounds and deposit their eggs. The mouth of every important shad and herring stream in the Chesapeake Basin is literally clogged with nets that are set for the special purpose of intercepting every fish, whereas a proper regard for the future welfare of the fisheries and for the needs of the migrating schools would cause the nets to be set so as to insure the escape of a certain proportion of the spawning fish.

Adequate protection of the fishes is compatible with great freedom of fishery and with a large and increasing yield. A very slight cur-

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tailment of the catch, perhaps as little as 10 per cent in any given year, may be sufficient to perpetuate the species and result in increased production in a few years. To disregard a requirement so small and to permit the continuance of an evil so serious simply invites and encourages the destruction of a most valuable food supply.

These conditions demand the immediate attention of the States and the application of a radical remedy. Their failure or inability to meet the situation by individual and cooperative action would seem to call for interference on the part of the Federal Government, a course which is being strongly urged by many thoughtful persons in the case of fishes which are migratory and can not be regarded as the property of any particular State.

PASSING OF THE STURGEON.

The story of the sturgeons is one of the most distressing in the whole history of the American fisheries. These large, inoffensive fishes of our seaboards, coast rivers, and interior waters were for years considered to be not only valueless but nuisances, and whenever they became entangled in the fishermen's nets they were knocked in the head or otherwise mortally wounded and thrown back into the water. Even in the present generation we have seen the shores of the Potomac River in the vicinity of Mount Vernon lined with the decomposing carcasses of these magnificent fishes, witnesses to the cruelty, stupidity, and profligacy of man, and the same thing has been observed everywhere in our country.

The next chapter in the story was the awakening of the fishermen to the fact that the eggs of the sturgeons had value as caviar and that the flesh had value as food. Then followed the most reckless, senseless fishing imaginable, with the result that in a comparatively few years the best and most productive waters were depleted, and what should have been made a permanent fishery of great profit was destroyed. Even after the great value of the sturgeon began to be appreciated by every one, the immature and unmarketable fish incidentally caught in seines, gill nets, and pound nets received no protection whatever in most waters and were ruthlessly destroyed as nuisances, the decline being thus doubly accelerated.

On the Atlantic coast the catch of the sturgeon fell from 7,000,000 pounds to less than 1,000,000 in 15 years; on the Pacific coast the same meteoric history was enacted, a catch of over 3,000,000 pounds annually in the early nineties being followed by a few hundred thousand pounds in later years of the same decade, with no improvement since that time, while on the Great Lakes the yield declined more than 90 per cent in 18 years. In the American waters of the Lake of the Woods, one of the most recent grounds for the exploitation of the sturgeon, the catch decreased over 96 per cent in 10 years, notwithstanding a more active prosecution of the fishing.

The sturgeon fishery as a whole reached its climax about 1890. For two or three years the annual catch was 12,000,000 to 15,000,000 pounds. At the present time the total yield does not exceed 1,000,000 pounds, and everywhere there is a steady downward trend in the catch. Some rivers that formerly supported a flourishing fishery are now absolutely depleted. The scarcity of the sturgeon and the demand for their flesh and eggs have run up the price to an extraor-

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dinary figure, never attained by any other fish, either in America or elsewhere. A mature female sturgeon often brings the fisherman more than $150 and it is a poor fish that can not be sold for $20 to $30 on the rivers of the east coast.

The most serious aspect of the sturgeon fishery is that, owing to the decimation of the schools of breeding fish and to peculiarities in spawning habits, it has been impossible as yet to inaugurate sturgeon culture anywhere in America. Attempts at artificial propagation have proved utter failures on the Great Lakes, Lake of the Woods, Lake Champlain, Delaware River and other waters, and the expenditure of considerable sums of money by the Bureau has sometimes failed to yield a single batch of eggs suitable for incubation.

Everywhere in America, under existing conditions, the sturgeons are doomed to commercial extinction, and it requires no prophet to foretell that in a comparatively few years the sturgeon will be practically extinct.

What is demanded in every State in which these fishes exist or have existed is absolute prohibition of capture or sale for a long term of years, certainly not less than 10. To advocate any less radical treatment would be only trifling with the situation.

A possible relief may be afforded by the Bureau through the transplanting in our waters of young sturgeon from other countries; and it may be noted that a supply of young fish of a very desirable species inhabiting the Danube River and the Caspian Sea has been kindly offered by the Roumanian Government. The successful administration of the sturgeon fisheries of southeastern Europe and the feasibility of undertaking the importation of young fish best adapted for American waters should receive attention.

FLORIDA SPONGE FISHERIES.

After seven years of earnest but futile effort the Bureau has found the act of June 20, 1906, for the protection of the sponge fisheries unenforceable in all of its provisions. The purpose of this law was to protect the sponges off the coast of Florida outside of territorial jurisdiction by preventing diving for them at all times in certain depths of water, and at certain times in all depths, and to prevent the taking, by whatever means, outside of the 3-mile limit, of sponges less than 4 inches in diameter. The offenses at which the act was aimed are not specifically prohibited, but they were supposed to be prevented by the prohibition of certain subsidiary acts—the landing, curing, or offering for sale in the United States of sponges taken in contravention of the real purpose of the law. To secure a conviction it is therefore necessary to establish a connection between (1) the act of taking under the objectionable circumstances and (2) certain subsequent and secondary acts which in themselves are innocuous. A diving vessel operating during the close season can not be interfered with until the sponges are landed, cured, or offered for sale in the United States. The sponges, therefore, must be followed or traced from their beds in the high seas to a point of territorial jurisdiction, a requirement which it is usually impossible to satisfy.

Acting through customs officers of the Treasury Department, various arrests of persons and seizures of vessels and sponges have been made, but no convictions have been secured except in one lot of cases

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in which the accused pleaded guilty and took appeals which have not yet been brought to issue. In these the evidence on which the prosecution based its action was the sworn statement of the master of each vessel, in which the facts necessary for conviction were admitted. After this experience the masters of the sponging vessels have refused to make further admissions of this character and no other sufficient evidence is obtainable, as the terms of the law are such that no further seizures or arrests can be made unless the offenders again furnish evidence against themselves.

The various defects already referred to were called to the attention of Congress, and on July 12, 1912, the Senate passed a bill (S. 6385) designed to correct them. Opposition to this measure developed among certain persons interested in the sponge fishery, and the House Committee on Merchant Marine and Fisheries conducted a hearing on the subject on August 1, 1912, since which time no action has been taken.

Efforts to enforce the law have continued, but the Bureau is now confronted with an opinion of the Solicitor of the Department holding that while the Secretary is empowered to direct the agents of the Department to perform such duties, not inconsistent with law, as may be necessary to enforce the provisions of the act, he is not authorized to direct them to make arrests or seizures. As the law can not be enforced without making arrests and seizures, the act of June 20, 1906, which fails to provide authority for such powers, is inadequate in that respect, in addition to its other defects.

The present situation in respect to the law is regrettable, not only on account of its failure to protect the sponge fisheries, but also from the fact that it is being openly flouted and there is being developed among a foreign population, a considerable proportion of which is seeking and attaining citizenship, a contempt for the laws of the land.

The law should be so amended as to make it enforceable, or it should be promptly repealed. The latter course would be regrettable because of the large interests involved in the sponge fisheries and the valuable product whose unnecessary destruction would thereby be condoned and facilitated.

MISCELLANEOUS ACTIVITIES AND RELATIONS OF THE BUREAU.

NEW STATIONS AND LABORATORIES.

The fish-cultural station in Jefferson County, Ky., authorized by Congress in 1911, has been located at Louisville, and 20 acres of land adjoining the State Fair Grounds were donated by the State of Kentucky for the purpose by a deed dated November 6, 1912. Construction work was delayed by floods, but was finally begun the latter part of February, 1913, and at the close of the fiscal year excellent progress had been made. The water supply for ponds and hatchery is from two wells 8 inches in diameter which have been sunk to a depth of 100 feet, in addition to which there is a well 60 feet deep for domestic purposes.

Plans for suitable pump houses have been prepared and the contract for their construction has been let. It is proposed to equip the wells with two electrically driven pumps each having a capacity of over 600 gallons per minute. A steel water tower and tank have been con-

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tracted for, several ponds have been excavated, and nearly all the supply and drain pipes have been laid. A dwelling for the superintendent has been completed at a cost of $5,958. This is a two-story, eight-room building with attic and cellar, heated with hot water.

For the fish-cultural station in South Carolina, authorized in 1911, 50 acres of land were purchased for $6,000 in December, 1912, near Orangeburg, a town somewhat south of the center of the State on the Southern and Atlantic Coast Line Railways. The tract contains several natural ponds, and the water supply is derived from springs. Construction work was begun the latter part of May, 1913, and by the end of the fiscal year the excavation of ponds was well under way, and plans had been prepared for the necessary buildings.

The Bureau has as yet been unable to acquire title to the site selected for the new hatching station near Saratoga, Wyo., for which Congress made provision in 1911.

The laboratory building at the Fairport, Iowa, station has been completed. It is a two-story, frame building with basement and attic, and contains 36 rooms. In addition to the various laboratory and office rooms, there are bedrooms, dining room, and kitchen for the use of investigators while temporarily on duty at the station. Three steam turbine-driven centrifugal pumps have been installed, having an aggregate of 75 horsepower, and discharging 2,300 gallons of water per minute against heads varying from 60 to 167 feet.

At the Homer, Minn., and Leadville, Colo., stations small cottages have been erected, and at Homer a contract has been let for a road across the station grounds connecting with the county highway.

At Birdsview, Wash., a new salmon hatchery 40 by 84 feet, of frame construction, was built for $2,663. The hatchery contains 52 troughs and has a capacity of 8,000,000 eggs. Darrington, Wash., has been selected as a site for an additional auxiliary salmon hatchery, but delay has been experienced in acquiring title to the property.

Final selection of a point for the biological laboratory on the Gulf coast of Florida has not been made. Various localities have been examined, and every effort will be put forth to obtain a site that will fulfil all the requirements of a marine station.

The sundry civil bill approved June 23, 1913, contained provision for two new fish-cultural stations—one in Rhode Island, the other in Utah.

PUBLICATIONS.

During the year the following pamphlets were published by the Bureau, besides the monthly statements of fishery products landed at Gloucester and Boston:

Some hydroids of Beaufort, North Carolina. By C. McLean Fraser. Bulletin, vol. xxx, 1910, p. 337–388, 52 text fig. 1912.

Preliminary examination of halibut fishing grounds of the Pacific coast. By A. B. Alexander. With introductory notes on the halibut fishery, by H. B. Joyce. 56 p. 1912.

Notes on a new species of flatfish from off the coast of New England. By W. C. Kendall. Bulletin, vol. xxx, 1910, p. 389–394, pl. lvii. 1912.

Mussel resources of the Holston and Clinch Rivers in eastern Tennessee. By R. E. Coker. 1912.

Alaska fisheries and fur industries in 1911. B. W. Evermann, Chief of Alaska Fisheries Service. 98 p. 1912.

Age at maturity of the Pacific coast salmon of the genus Oncorhynchus. By C. H. Gilbert. Bulletin, vol. xxxii, 1912, p. 1–22, pl. i–xvii. 1913.

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A new species of trout from Lake Tahoe. By John O. Snyder. Bulletin, vol. XXXII, 1912, p. 23–28. 1912.
Condition and extent of the natural oyster beds and barren bottoms of Mississippi Sound, Alabama. By H. F. Moore. 61 p., 5 pl., 1 chart. 1913.
The distribution of fish and fish eggs during the fiscal year 1912. 108 p. 1913.
Identification of the glochidia of fresh-water mussels. By Thaddeus Surber. 10 p., 3 pl., 1912.
Report of the Commissioner of Fisheries for the fiscal year ended June 30, 1912. 69 p. 1913.
Description of a new darter from Maryland. By Lewis Radcliffe and William W. Welsh. Bulletin, vol. XXXII, 1912, p. 29–32, pl. XVIII. 1913.
Condition and extent of the natural oyster grounds and barren bottoms of Mississippi east of Biloxi. By H. F. Moore. 41 p., 6 pl., 1 chart. 1913.
The sense of smell in fishes. By G. H. Parker and R. E. Sheldon. Bulletin, vol. XXXII, 1912, p. 33–46. 1913.
The fishes of Monterey Bay and tributaries. By John O. Snyder. Bulletin, vol. XXXII, 1912, p. 47–72, pl. XIX–XXIV, 3 text fig. 1913.
Anatomy and histology of the alimentary tract of the king salmon. By Charles W. Greene. Bulletin, vol. XXXII, 1912, p. 73–100, pl. XXV–XXVIII. 1913.
Notes on the natural hosts of fresh-water mussels. By Thaddeus Surber. Bulletin, vol. XXXII, 1912, 101–116, pl. XXIX–XXXI, 1 text fig. 1913.

A new series of publications has lately been inaugurated under the title "Economic circulars," with independent serial numbers. These circulars are the medium for brief advance reports upon investigations, to be more fully treated in subsequent papers, and also for timely information not requiring more lengthy treatment. Often the subject matter will be of interest to certain industries or localities only, and for this reason the economic circulars will not be distributed to addresses upon the regular and permanent mailing lists but to special lists or upon individual request.

APPROPRIATIONS.

The total of appropriations for the Bureau for the fiscal year 1913 amounted to $944,790, as follows:

Salaries	$390,790
Miscellaneous expenses:	
Administration	10,000
Propagation of food fishes	335,000
Inquiry respecting food fishes	40,000
Statistical inquiry	7,500
Maintenance of vessels	60,000
Alaska Fisheries Service	90,000
Beam-trawl investigation	5,000
Protection of sponge fisheries	3,500
Preparation of reports on fisheries of the Philippine Islands	3,000
Total	944,790

An itemized statement of expenditures authorized by the foregoing appropriation has been made as required by law.

FISHERY MATTERS IN CONGRESS.

An act to create a legislative assembly in the Territory of Alaska approved August 24, 1912, contained a special provision denying to the legislature any authority to alter, amend, modify, or repeal any laws of the United States applicable to Alaska affecting fish, game, fur seals, or other fur-bearing animals. Notwithstanding this prohibition, the legislature, at its first session beginning in March, 1913, considered various fishery bills, and even passed a measure

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increasing the tax on canned salmon, one-half this revenue to be for Territorial uses, the other for conservation of the fisheries under direction of the Bureau of Fisheries.

An act to give effect to the convention between the Governments of the United States, Great Britain, Japan, and Russia, for preservation and protection of the fur seals and sea otter which frequent the waters of the North Pacific Ocean, concluded in Washington, July 7, 1911, passed Congress and was approved August 24, 1912. An important provision of this act is the establishment of a five-year close season on the Pribilof Islands, during which time all killing of seals is prohibited except for the food purposes of the natives.

EXECUTIVE ORDERS AND PROCLAMATIONS AFFECTING THE FISHERIES.

Satisfactory information having been received that the Governments of Great Britain, Japan, and Russia had taken the necessary steps to give effect to the first article of the convention concluded July 11, 1911, for the preservation and protection of fur seals and sea otter in the North Pacific Ocean, the President, on May 31, 1913, issued the following proclamation:

Whereas, by the first article of the Convention between the Governments of the United States, Great Britain, Japan and Russia for the preservation and protection of the fur seals and sea otter which frequent the waters of the North Pacific Ocean, concluded at Washington July seventh, nineteen hundred and eleven, it is provided as follows:

The High Contracting Parties mutually and reciprocally agree that their citizens and subjects respectively, and all persons subject to their laws and treaties, and their vessels, shall be prohibited, while this Convention remains in force, from engaging in pelagic sealing in the waters of the North Pacific Ocean, north of the thirtieth parallel of north latitude and including the Seas of Bering, Kamchatka, Okhotsk and Japan, and that every such person and vessel offending against such prohibition may be seized, except within the territorial jurisdiction of one of the other Powers, and detained by the naval or other duly commissioned officers of any of the Parties to this Convention, to be delivered as soon as practicable to an authorized official of their own nation at the nearest point to the place of seizure, or elsewhere as may be mutually agreed upon; and that the authorities of the nation to which such person or vessel belongs alone shall have jurisdiction to try the offense and impose the penalties for the same; and that the witnesses and proofs necessary to establish the offense, so far as they are under the control of any of the Parties to this Convention, shall also be furnished with all reasonable promptitude to the proper authorities having jurisdiction to try the offense;

And, whereas, by an Act entitled "An Act to give effect to the Convention between the Governments of the United States, Great Britain, Japan and Russia for the preservation and protection of the fur seals and sea otter which frequent the waters of the North Pacific Ocean, concluded at Washington July seventh, nineteen hundred and eleven," approved August 24, 1912, it is provided that the President of the United States shall determine by proclamation when the other parties to said Convention, by appropriate legislation or otherwise, shall have authorized the naval or other officers of the United States, duly commissioned and instructed by the President to that end to arrest, detain, and deliver to the proper officers of such parties, vessels and subjects under their jurisdiction, offending against said Convention or any statute or regulation made by those Governments to enforce said Convention; and that his determination shall be conclusive upon the question;

Now, therefore, I, Woodrow Wilson, President of the United States of America, by virtue of the power and authority conferred upon me by the said Act approved August 24, 1912, do hereby declare that satisfactory information has been received by me that the Governments of Great Britain, Japan and Russia have authorized the naval or other officers of the United States to arrest, detain, and deliver to the proper officers of such Governments, respectively, all persons and vessels subject to their jurisdiction, offending against said Convention, or against any statute or regulation made by those Governments to enforce its provisions; and I do further declare that from and

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after the date of this Proclamation any person or vessel subject to the jurisdiction of the United States offending or being about to offend against the prohibitions of said Convention, or of said Act, or of the regulations made thereunder, may be seized and detained by the naval or other duly commissioned officers of any of the parties to the said Convention other than the United States, except within the territorial jurisdiction of one of the other of said parties, on condition, however, that such person or vessel so seized and detained shall be delivered as soon as practicable at the nearest point to the place of seizure, with the witnesses and proofs necessary to establish the offenses so far as they are under the control of such party, to the proper official of the United States, whose courts alone shall have jurisdiction to try the offense and impose the penalties for the same.

By an Executive order dated March 3, 1913, the islands of the entire Aleutian Chain, Alaska, were reserved and set apart as a preserve and breeding ground for native birds, for the propagation of fur-bearing animals, and for the encouragement and development of the fisheries. Jurisdiction over the wild birds, game and fur-bearing animals was placed with the Department of Agriculture, and jurisdiction over the fisheries, seals, sea otter, cetaceans, and other aquatic species with the Department of Commerce.

PERMANENT INTERNATIONAL COUNCIL FOR EXPLORATION OF THE SEA.

The eleventh annual session of the Permanent International Council for the Exploration of the Sea was held in Copenhagen, Denmark, in September, 1912. All of the affiliated countries were represented by delegates and experts, and the United States for the first time had official connection with the council. The participation of this country was regarded as one of the leading features of the meeting, and much satisfaction was expressed that the United States had entered into cooperative study of the Atlantic Ocean in the interests of the fishing industry. One full session of the council was devoted to a discussion of the special investigations that might be carried on by the United States and of the valuable results that might be expected from the coordination of fishery work on the two sides of the North Atlantic. The subject was considered also at the meetings of the various sections into which the council is naturally divided.

At the concluding session of the council, formal resolutions were passed with reference to the special lines of biological and physical research that are desirable on the North American coasts by way of supplement to the work already done on the west coast of Europe. The cooperative investigations recommended for the United States have direct relation to problems now receiving the attention of the council, some of which (as, for example, the variation in the abundance of the common mackerel) are of great interest in America at the present time, while others (such as the biological and economic effects of trawl-net fishing) are certain to be most important to us in the near future.

Occasion having arisen for the election of a new president of the council, the unanimous choice of the delegates was Geheimrat Fritz Rose, vice president of the council and president of the semiofficial Deutsche See-Fischerei Verein. In the reorganization of the executive body of the council, the matter of the representation of the United States thereon was brought up. In view of the recent adhesion of this country to the membership and the difficulty of sending

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delegates to attend the purely business meetings, the United States delegate advised that, for the present, no position on the executive board was desired. Ultimately, however, it will become necessary for the United States, as one of the great fishing nations in this affiliation, to assume its share of responsibility and labor connected with the administration of the business affairs of the council.

In view of the various and diverse subjects that come before the council at the meetings of the sections devoted to hydrographic, planktonic, and fishery investigations, it is impossible for one delegate adequately to represent the United States and to derive the proper benefit from participation in the meetings. It is therefore important that hereafter the United States have two delegates in attendance, and thus conform with the practice of the other nations.

SOME NEEDS OF THE SERVICE.

NEW OFFICE BUILDING, WITH LABORATORIES AND PUBLIC AQUARIUM.

The present office building of the Bureau of Fisheries is entirely unsuitable for the purpose, being antiquated, overcrowded, and insanitary. The office and laboratory accommodations impede the transaction of business and retard development along several important lines. Whether or not the Bureau is provided with administrative offices in a general department building or in a special structure in close proximity to the parent headquarters is immaterial. There are urgently needed, however, peculiar laboratory accommoations, a model hatchery equipment, and aquarium facilities which can not be afforded in a large department building; and incidental thereto there should be provided a national aquarium, which can be maintained at minimum cost as an essential part of the experimental work of the Bureau in the study of water animals and of fish-culture methods.

A LOBSTER-REARING PLANT.

More than 10 years ago the Bureau, with the aid of a special appropriation from Congress, devised and carried to a successful stage of perfection a feasible method of rearing lobsters. This work was undertaken in the well-founded belief that lobster culture would and should be made more effective by carrying the newly hatched young beyond the helpless free-swimming age to the point where they develop their crushing claws, go to the bottom, and assume the form and habits of the adults.

The Government has never made any use of the knowledge thus acquired, but the State of Rhode Island, continuing the experimental work, has achieved marked success and has demonstrated the practicality of the method when employed on a large scale.

As an aid to an industry that is in a critical state, it is recommended that Congress be asked to provide for a lobster-rearing station, either as an independent plant or as an adjunct of one of the existing marine hatcheries of the Bureau. For this purpose a sum not exceeding $20,000 would be required for construction and for operating expenses for one year. No facilities for holding and rearing young lobsters now exist at any of the established stations.

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STATE COOPERATION.

With the increasing activity in all branches of the fisheries there exists increasing need for active cooperative endeavor on the part of the States to make more effective the work of artificial propagation as carried on under Federal and State auspices. There can be no question that a large amount of such work is now rendered entirely futile by the lack of cooperation or the total indifference of the States. Attention is drawn elsewhere to the great damage that is being done to the shad and alewife fisheries on the Atlantic coast by failure to enact and enforce suitable protective laws. The cases of other fisheries similarly neglected might be cited.

It may well be questioned whether the Bureau is justified in spending money in behalf of the artificial propagation of certain fishes in certain waters when there is every reason to believe that the expenditures are for the most part utterly wasted. The situation demands the attention of Congress and the adoption of a definite policy to meet the case. The question arises whether the Federal Government should not insist, as a condition of continued Government aid in behalf of the State fisheries, on an amount of protection for the fishes cultivated that common sense shows to be necessary for the maintenance of the supply. The alternative course would seem to be the assumption of Federal jurisdiction over migratory fishes and fishes in interstate waters.

A FISHERIES RESEARCH LABORATORY ON THE PACIFIC COAST.

The Bureau now has two laboratories on the Atlantic coast, one in the Mississippi Valley, and one authorized on the Gulf of Mexico for the scientific and practical investigation of problems relating to the fisheries. On the Pacific coast it is unprovided with laboratory facilities, and it is felt that this deficiency should be corrected as speedily as possible.

The fisheries of the Pacific coast, including Alaska, are valued at upward of $22,000,000, and their products are of such character as to enter into consumption in all parts of the country. There are many potential products which are not yet utilized for lack of definite information concerning their qualities and merits, and there are others the handling of which can be greatly improved. The Bureau believes that if it were provided with the equipment needed for practical investigation and experiment it could increase the volume, improve the quality, and cheapen the cost of the yield of these important fisheries and at the same time lower the price to the consumer.

This form of aid to the fishing industry is believed to be a strictly pertinent function of the Federal Government, and the early establishment of an up-to-date research station is strongly advocated.

INCREASED FACILITIES FOR ALASKA FISHERIES SERVICE.

The attention of Congress has been drawn by the Secretary, in deficiency and regular estimates submitted on behalf of the Bureau, to the urgent need for additional men and vessels to enforce the Alaska fishery laws and to make inspections and investigations on

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which to base recommendations for new laws, new regulations, or amendments to existing laws. To properly carry out the duties imposed by Congress there should be a thorough patrol of the fishing districts of Alaska each season by agents of the Bureau. This involves travel along 25,000 miles of shore, and necessitates a considerable addition to the present force of men and a number of small vessels by means of which the agents may be transported from fishery to fishery without being under the necessity, as at present, of being entirely dependent on the favor of the fishery operators. The minimum requirements in this respect have been embodied in estimates for the fiscal year 1915, and favorable action thereon by Congress would seem to be demanded by the great magnitude of the interests at stake.

RELIEF FROM INCONGRUOUS DUTIES.

It is recommended that the Secretary take under consideration the advisability of appealing to Congress for relief from the necessity of administering the laws and regulations affecting the fur-bearing animals of the Territory of Alaska. This subject is not even remotely related to the legitimate functions of the Bureau of Fisheries, but comes naturally under the jurisdiction of another Government bureau. The continued administration of this incongruous service with the absurdly small and inexperienced force allowed by Congress is not only imposing on the Bureau an uncongenial duty, which it is not equipped to perform, but is distracting and diverting much attention that belongs to and is required by the fishing industry.

This recommendation does not apply to the aquatic animals whose pursuit constitutes a "fishery," but only to the strictly terrestrial mammals.

A FISHERY EXPERIMENT STATION.

Fish culture has reached a high degree of perfection in the United States, and the magnitude of the operations as a whole leaves little to be desired. There is, however, much room for effective work in fish culture similar to that conducted in animal and plant industry at agricultural experiment stations; and one of the great and growing needs of the service is an experiment station for study of fish diseases and of problems in fish breeding.

The matter of improving the food and game qualities of fishes by selective breeding is a subject to which practically no attention has as yet been given in this country, but the possibilities are alluring and the project is well worthy of support from Congress, in view of the great improvements that have been produced in domestic animals and plants by the application of scientific methods.

The serious aspect of disease among cultivated fishes has frequently been set forth in the Bureau's reports and brought directly to the attention of Congress. An experiment station would no doubt pay for itself every year in the actual money value of fish saved that are now lost at the hatching stations all over the country because of lack of knowledge of the proper means for preventing and curing the various destructive maladies to which domesticated or semi-domesticated fish are liable.

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INCREASED AID TO THE SHELLFISH INDUSTRIES.

The oyster fishery of this country is the most valuable fishery in the world, and its yield to the fishermen of approximately $16,000,000 annually is greater than that of the combined fisheries of Norway, which constitute one of that country's greatest assets. Shellfish, including oysters, create more than one-third of the value of aquatic products of the United States, and they afford food of vast importance to the people, yet the aid given to the industry by the Government is far less than that extended in propagating such fishes as black bass, whose chief value is to afford sport and recreation rather than food.

The oyster, and most of the other shellfishes, owing to their peculiar habits and methods of breeding, can not be propagated as are the true fishes. Oyster culture is of necessity a private enterprise, but it presents many difficulties and dangers which the growers are not in a position to combat, for lack of proper knowledge, and this knowledge can not be obtained excepting through investigations and experiments which the Government alone is in a position to conduct.

The Bureau is without the means, and particularly the personnel, to carry on this much-needed work, although the deficiency and the necessity which it creates have been repeatedly pointed out in these reports and in the estimates for appropriations.

Those interested in the oyster fishery in particular have repeatedly pointed out, with justice, the difference between the lack of consideration which is accorded their industry and the assistance which is received by agricultural interests. Farmers encountering difficulty find help available, but the oystermen laboring under much greater disadvantage find it withheld for the reason that the Bureau has not been provided with the means for extending it. In all justice and for the very practical consideration that our food supplies should be increased and assured, this condition should be corrected without further delay.

Respectfully,

H. M. SMITH,
Commissioner.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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REPORT

OF THE

COMMISSIONER OF LIGHTHOUSES

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REPORT

OF THE

COMMISSIONER OF LIGHTHOUSES.

DEPARTMENT OF COMMERCE,
BUREAU OF LIGHTHOUSES,
Washington, November 17, 1913.

SIR: There is submitted herewith my annual report for the fiscal year ended June 30, 1913.

ORGANIZATION OF THE LIGHTHOUSE SERVICE.

The reorganization of the Lighthouse Service under the provisions of the act of Congress approved June 17, 1910, was entirely completed during the early part of the fiscal year 1913. All of the lighthouse districts, with the exception of the three river districts, are now in charge of civilian inspectors. It is believed that the efficiency of the Service has been increased by the reorganization and that the work is more economically performed.

The general organization of the Lighthouse Service is now as follows:

The office in Washington, which is the executive center of the Service, is under the Commissioner of Lighthouses and the Deputy Commissioner. There are in this office an engineering construction division, under the chief constructing engineer; a naval construction division, under the superintendent of naval construction; a hydrographic division, under an assistant engineer; and the general office force, under the chief clerk.

The Service outside of Washington is divided into 19 lighthouse districts, each of which is under the charge of a lighthouse inspector. In each district there is a central office at a location selected on account of either its maritime importance or its geographical position, and there are also one or more lighthouse depots located conveniently for carrying on the work of the district in the matter of storing and distributing supplies and apparatus. Each district is provided with one or more lighthouse tenders for the purpose of distributing supplies to the various stations and light vessels and for transportation of materials for construction or repair, for the placing and care of the buoyage system in the district, and for transporting the inspector and other officers of the Service on official inspections of stations and vessels and on other official duty.

In addition to the several district depots, there is in the third lighthouse district, on Staten Island, New York Harbor, a general lighthouse depot, where many of the supplies for the whole Service are purchased and stored and sent out for distribution, where much

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of the special apparatus of the Service is manufactured or repaired, and where also there is carried on various technical work in the way of testing apparatus and supplies and designing or improving apparatus.

PERSONNEL.

The table following gives the number of employees of the Lighthouse Service at the end of the fiscal year and a comparison of the totals with those for the previous fiscal year.

EMPLOYEES IN THE LIGHTHOUSE SERVICE ON JUNE 30, 1913.

District.	Executive officers, inspectors, engineering force, and draftsmen.	Clerks, messengers, janitors, and office laborers.	Depot keepers and assistants.	Light keepers and assistants.	Laborers in charge of lights (appropriation "Salaries, Keepers of lighthouses").	Laborers in charge of post lights (appropriation "General expenses").	Custodians of reservations.	Officers and crews on tenders and light vessels.	Field force for construction and repair (registered).	Field force for construction and repair (unregistered).	Total.
Bureau	17	31	0	0	0	0	0	0	0	0	48
First	2	6	1	113	3	0	0	59	6	3	193
Second	4	6	2	81	11	0	0	202	2	7	315
Third	13	28	9	179	37	52	2	260	142	29	751
Fourth	3	5	3	54	5	12	6	23	8	10	129
Fifth	6	8	12	180	85	23	1	191	17	11	534
Sixth	4	7	4	66	7	25	0	138	7	4	262
Seventh	2	3	1	51	1	0	0	27	2	3	90
Eighth	4	6	2	105	16	33	0	89	4	12	271
Ninth	2	4	2	33	4	1	0	26	8	10	90
Tenth	4	5	1	68	1	0	0	33	6	10	128
Eleventh	5	6	7	165	13	2	1	88	7	45	339
Twelfth	4	6	4	160	2	2	0	93	7	26	304
Thirteenth	1	2	0	0	0	322	0	0	0	0	325
Fourteenth	1	2	0	0	0	541	0	18	0	0	562
Fifteenth	2	2	0	0	0	449	0	19	0	0	471
Sixteenth	3	4	1	28	0	7	0	26	4	4	77
Seventeenth	4	6	2	78	14	102	0	101	6	4	317
Eighteenth	3	6	5	108	5	4	0	88	8	3	230
Nineteenth	3	3	1	31	3	0	0	28	0	31	100
Total, 1913	86	146	57	1,500	207	1,575	10	1,509	234	212	5,536
Total, 1912	81	140	51	1,497	185	1,570	5	1,516	286	203	5,534
Increase	5	6	6	3	22	5	5	.....	.....	9	2
Decrease	.....	.....	.....	.....	.....	.....	.....	7	52	.....	.....

AIDS TO NAVIGATION.

During the fiscal year ended June 30, 1913, there was a net increase of 591 in the total number of aids to navigation maintained by the Lighthouse Service, including 2 light vessels, 56 lights above the order of minor lights, 10 fog signals, 3 submarine bells, 171 daymarks, 51 lighted buoys, 184 unlighted buoys, and 114 minor lights.

Fixed lights were changed to flashing or occulting at 26 stations. The illuminant of 73 lights was changed to incandescent oil vapor, and the illuminant of 30 lights was changed to acetylene. Light vessels were established during the year at 3 new stations, and 1 light vessel station was discontinued, the latter being due to moving the light vessel from South Pass to Southwest Pass, La. On June 30, 1913, there were maintained by the Lighthouse Service, 13,434 aids to navigation, including 4,739 lights of all classes, and 566 fog signals, of which 46 are submarine signals. It is believed that the systematic methods of improvement and the use of modern apparatus in increas-

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ing the number and brilliancy of aids have been of value to the safety of commerce.

The following table gives a summary of the aids to navigation, under each class, established and discontinued during the fiscal year, and also the net increase, and the number in commission at the end of the fiscal years 1912 and 1913:

Class.	1913			Total number June 30—	
	Established.	Discontinued.	Increase.	1912 [a]	1913
Lighted aids:					
Lights (other than minor lights)	75	19	56	1,475	1,531
Minor lights	331	217	114	2,552	2,666
Light-vessel stations	3	1	2	51	53
Gas buoys	75	33	42	346	388
Float lights	14	5	9	92	101
Total	498	275	223	4,516	4,739
Unlighted aids:					
Fog signals	10	0	10	510	520
Submarine signals	3	0	3	43	46
Whistling buoys, unlighted	3	3	0	84	84
Bell buoys, unlighted	19	8	11	205	216
Other buoys	505	332	173	6,001	6,174
Day beacons	345	174	171	1,484	1,655
Total	885	517	368	8,327	8,695
Grand total	1,383	792	591	[a] 12,843	13,434

[a] Differences from statistics published in 1912 report are due to minor discrepancies in previous count.

The following are some of the more important aids which have been established or materially improved during the past fiscal year:

Second-order incandescent oil-vapor light established: Kilauea Point, Kauai Island, Hawaii—about 250,000 candlepower.

Fourth-order incandescent oil-vapor lights established; Miah Maull Shoal, N. J.; San Pedro Breakwater, Cal.; Alki Point, Wash.; Superior Entry South Breakwater, Wis.

New light vessels placed on station: Milwaukee, *No. 95*, Wis.; Buffalo, *No. 82*, N. Y.

South Pass Light Vessel *No. 43*, La.: Moved to Southwest Pass, Mississippi River.

Bush Bluff Light Vessel *No. 97*, Va.: Changed to flashing electric light.

First-class air sirens established: Point Loma, Cal.; San Pedro Breakwater, Cal.

Reed horn fog signal established: Moose Peak, Me.: Alki Point, Wash.

Fog bell established: Negro Point, N. Y.

Submarine fog bell established: Off Whitefish Point, Mich.; on Buffalo Light Vessel *No. 82*, entrance to Buffalo Harbor, N. Y.

A gas, whistling, and submarine bell buoy was established at Orford Reef, Oreg.

Other important gas buoys established: Block Island North Reef, N. Y. (bell); Chesapeake Bay entrance, Va.; Neah Bay, Wash. (whistle); South Pass, Mississippi River, La. (whistle); Columbia River entrance, Oreg.-Wash. (2 buoys, 1 with whistle); Joe Flogger Shoal, Delaware Bay, Del. (bell); Boulder Reef, Lake Michigan.

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Systems of minor aids and buoyage extensively rearranged or improved in important harbors: Boston Harbor, Mass.; Nantucket Sound, Mass.; Connecticut River, Conn.; Ambrose Channel, N. Y.; Delaware Bay and River, Del., N. J., and Pa.; Baltimore Harbor, Md.; Hampton Roads, Va.; Newport News, Va.; Tybee Roads, Ga.; St. Johns River, Fla.; Key West Harbor, Fla.; Tampa Bay, Fla.; Mobile Bay, Ala.; Sabine Pass, Tex.; Niagara River, N. Y.; Maumee Bay and River, Ohio; Detroit River, Mich.; Columbia River, Oreg.-Wash.

Flashing acetylene lights established: Blank Island, Spanish Island, Sukoi Islets, Cape Fanshaw, Shakan Bay, Key Reef, Lone Tree Point, Point Helen, Busby Island, Seal Island, Point Hugh, Grave Point, Lord Rock, Alaska; Milwaukee South Pierhead, Manitowoc South Breakwater, Wis.; Galveston Bay Channel, Tex.; Reeds Hammock, N. C.; Cape Fear River, N. C. (10 lights); Negro Point, N. Y.; Livingstone Channel, Detroit River, Mich. (6 lights).

The mildness of the past winter has permitted keeping on station many gas buoys which ordinarily are removed during the season of heavy ice. In the Delaware River and Bay, for the first time since gas buoys were established there, half of the gas buoys were maintained on station throughout the winter.

Measures have been taken for improvement in the marking of light-vessel stations for the purpose of lessening the danger of an approaching ship mistaking one light vessel for another. The names of light vessels have been simplified, thus permitting the distinguishing word for the vessel to be painted in larger letters, which can be read at a much greater distance. In every case the important distinguishing word has been retained on the vessel, so that there is no difficulty in the mariner identifying the station. These recent improvements made to avoid danger in confusing relief light vessels consist in assigning code-signal letters to every coast light-vessel station and having the relief lightship display the code-signal letters of the station to approaching vessels whenever necessary to warn them of the name of the station, and also in having the relief vessel so equipped that she can show the identical light of the station ship at night, and during fog the identical fog signal; also, the relief vessel will sound the same code number on the submarine bell. To avoid confusion when light vessels are off their stations while proceeding to or from port, all light vessels have been directed, under such circumstances, to show the international code-signal letters "QE," meaning lightship is not at anchor on her station.

The practice has been inaugurated of publishing from time to time special poster notices to mariners for the more important changes in aids to navigation. It is intended that these notices be displayed in such offices and places as are frequented by mariners, in order to bring important changes prominently to their attention. When practicable six months advance notice is given of all important changes in seacoast aids, and the notice is repeated in the weekly notice in the first issue of each month until the change is carried into effect. The mailing list for notices is revised from time to time with the view of obtaining the maximum publicity for all changes.

Regulations for standard-size buoy letters and numbers issued during the year have had the effect of producing general uniformity in this system of marking throughout the Service.

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Arrangements have been made so that the United States Naval Radio Station at Arlington, Va., will send by wireless twice a day to shipping along the Atlantic coast important emergency information regarding aids to navigation.

A board, consisting of engineer officers of the Army and lighthouse inspectors appointed October 29, 1912, to consider and report upon the most feasible, advantageous, and economical method of providing suitable aids to navigation at or near the extremity of the south jetty at the mouth of the Columbia River, Oreg., recommended a system of buoys and range lights, which have since been established.

ALASKA.

The total number of aids to navigation in Alaska, including lights, fog signals, buoys, and daymarks, in commission at the close of the fiscal year ended June 30, 1913, was 279, including 93 lights, representing an increase of 56 lights since June 30, 1910, or 150 per cent. The following table, which gives the total number of aids to navigation on June 30 of each year named, illustrates the progress in establishing aids in the Territory:

Aids.	1910	1911	1912	1913
Lights	37	71	85	93
Fog signals	9	10	10	10
Buoys	84	105	132	136
Daymarks	30	29	38	40
Total	160	215	265	279

The work of rebuilding and improving the present light and fog-signal station at Lincoln Rock, under the special appropriation of $25,000 made by the act of March 4, 1911, has been completed.

The act approved March 4, 1913, authorized a light and fog-signal station at or near Cape St. Elias, at a cost not to exceed $115,000, and an appropriation of this amount was made subsequent to the close of the fiscal year.

An estimate for an appropriation of $325,000 for a new tender to replace the *Armeria* is included in the Department's estimates for the fiscal year 1915, which also include an item for the establishment of aids to navigation and the improvement of existing aids in Alaska, in the sum of $60,000.

GUANTANAMO, SAMOA, AND GUAM.

Complete reports have been received from naval officers in local charge of the outlying United States territory at Guantanamo Bay, Cuba; the American Samoan Islands; and the island of Guam in reference to the aids to navigation at each place, which are maintained under the supervision of the naval commandants by means of allotments made from the appropriations for the Lighthouse Service. These reports indicate that the aids have been properly maintained, at an approximate annual expense as follows: Guantanamo, $2,700; Samoa, $700; Guam, $300.

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ADMINISTRATION METHODS AND ECONOMIES.

During the year systematic inspections have been continued in the various lighthouse districts by the general inspector as respects the technical work and vessels, and by the examiner as to business methods, property accounts, and clerical organization. The effects of this work have been of great value in maintaining the vessels and other equipment of the Service to a proper standard, systematizing methods in the district organizations, auditing district property accounts, and examining records.

The standard method of cost keeping has been continued throughout the year with satisfactory results. A statement regarding it, with a generalized summary of results for the fiscal year, is given under a separate head.

Further improvements have been made in the publication of light and buoy lists during the year, the light lists being designed for the general use of navigators, and the buoy lists being for local and service use.

A special disbursing agent has been appointed in each lighthouse district in order to insure expeditious payment to creditors of the Service, with satisfactory results.

Under the authority of the act of June 27, 1912, an arrangement was made with the Navy Department for the purchase of crews' uniform clothing from naval stores by this Department, to be sold to the employees of the Lighthouse Service, and the appropriations reimbursed, as provided for by law.

In making requisitions on the general depot for supplies and other articles needed in the Service a new method of charging the amount of such requisition to the district making the request, accompanied by an automatic transfer of funds, has been put into operation. The former practice was to provide the general depot with sufficient funds for meeting all requests and not charging the cost to the districts making such requests, which in some cases resulted in larger requisitions being made than were immediately necessary, and it is believed that a considerable economy has been effected by the establishment of this new method.

Commutation of subsistence on lighthouse vessels, authorized by the act of August 24, 1912, was put into effect on a number of tenders shortly after the passage of the act, and has proven successful in reducing office work in the preparation of proposals and other papers for subsistence supplies, and has also been conducive to the comfort and satisfaction of the complements of vessels. It is now being extended to light vessels, under proper restrictions as to reserve provisions.

A new schedule of complements and rates of pay for officers and crews of light vessels was put into effect during the year. This was a part of the general reorganization of the Lighthouse Service contemplated by the act of June 17, 1910, and has had the effect of standardizing the pay scale for different types of vessels and stations.

A revision was made of the schedule of officers of tenders, under which there were authorized 16 second officers and 9 second assistant engineers for certain tenders where the needs of the Service require a licensed officer who may be placed in charge of the vessel or its machinery, 4 positions each of cadet officer and cadet engineer for

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the Atlantic coast and Lake districts, and 1 position each of cadet officer and cadet engineer for the Pacific coast districts. These positions are in the Lighthouse Service at large, in order that these cadet officers and cadet engineers may be transferred as their services may be required, thus giving young men who enter the Service in these positions a varied experience in lighthouse-vessel work and fitting them for more responsible duties.

New regulations for shore liberty and annual leave for keepers of light stations and officers and crews of light vessels were put into effect during the fiscal year. These provide for a maximum of shore liberty and leave of 72 days a year for keepers and 90 days a year for crews of light vessels.

Regulations providing for leave of absence for crews of tenders were also issued.

Authority has been granted to allow to members of crews who are sick in hospitals, who have served on a lighthouse vessel for at least one year preceding the date of entrance into the hospital, pay for not exceeding 60 days of the confinement in hospital, provided such members of crews return to duty and serve for two months or more thereafter.

New log books for vessels were issued which provide for recording the necessary information in a more systematic and compact form.

Regulations providing for a systematic method of advertising proposals for furnishing materials, services, or supplies, through newspapers and otherwise, were issued during the year.

A drawing showing the various types of buoys used by the Lighthouse Service, for the assistance of officers of lighthouse tenders charged with the work of relieving and establishing such aids, was issued.

Instructions for the operation of different types of gas buoys have been issued.

Inspectors are required to report annually the description and condition of all spare property or equipment on hand in their districts. These reports are then consolidated and distributed to the various districts in order that an economical exchange or transfer of such equipment not needed by one district but perhaps by another may be effected.

The application of the parcel-post law to the Lighthouse Service has considerably facilitated the shipping of various small articles required from time to time at stations and on vessels.

Cards giving general rules as to the admission of visitors have been printed for posting at light stations. The keeper of the Absecon Light Station at Atlantic City, N. J., reported that during the three months ended September 30, 1912, 10,339 visitors registered at the station. This station is visited probably more than any other light station in the United States.

During the year an inquiry was made concerning the extent, accessibility, and historical nature and value of all archives of the Lighthouse Service up to the year 1873.

New civil-service regulations for the Lighthouse Service were published.

There have been issued new regulations prescribing uniforms for officers and crews of vessels of the Lighthouse Service.

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The publication of a monthly four-page lighthouse bulletin has been continued throughout the year. This contains information of general interest to officers and employees of the Lighthouse Service, describing changes in aids or personnel, improvements in apparatus and methods, and other matters to which general attention should be called.

COST-KEEPING SYSTEM AND RESULTS.

A standard method of cost keeping has been continued in effect throughout the fiscal year, with some modifications, and reports have been received from all the districts, in which itemized costs of each office, depot, light and fog signal station, tender, and light vessel are shown separately. The costs of minor lights, daymarks, and lighted and unlighted buoys are shown in groups by various districts, each type of aid to navigation being accounted for separately. In all cases the costs are divided into main headings—maintenance and betterments. The cost of maintenance includes what may be considered fixed charges, such as salaries, rations, fuel, and general expendable supplies. The item of betterments includes repairs, improvements, and new construction, and is further subdivided to show the cost of labor and materials separately for each principal object.

The costs are based on the actual expenditures during the fiscal year, whether of money or supplies. They are checked with the money accounts by taking into consideration the actual cash expenditures and the difference in the value of supplies on hand at the beginning and at the end of the year. By continuing to compile this information from year to year accurate figures can be derived, which will be useful in preparing estimates, planning work, effecting economies, and comparing the efficiency of different districts, vessels, light stations, apparatus, methods, etc.

A generalized summary of costs for the fiscal year ended June 30, 1913, follows, as derived from this cost-keeping system. It will be noted that a slight reduction in the cost of maintenance in a number of classes of aids to navigation has been effected, as compared to figures for the fiscal year 1912. Overhead charges, offices, depots, and tender service are stated as separate features in this summary and are not distributed nor included in the costs of aids to navigation.

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SUMMARY OF COSTS, LIGHTHOUSE SERVICE, FISCAL YEAR ENDED JUNE 30, 1913.

TOTAL COSTS OF PRINCIPAL FEATURES.

[Amounts are stated to nearest even dollar, causing occasional minor discrepancies in totals. Difference from total expenditures reported elsewhere is due to inclusion of Bureau salaries, printing expenses, and adjustment of inventories of articles already in stock.]

Feature.	Maintenance expenses.					Betterment expenses.				Grand total.	Per cent.
	Salaries.	Rations.	General supplies.	Incidental expenses.	Total.	Repairs and improvements.		Works under special appropriations.	Total.		
						Labor.	Materials and supplies.				
Administration [a]	$326,777		$52,958	$2,134	$381,869					$381,869	7
Distributive charges [b]	698,884	$201,495	371,246	15,631	1,287,256	$123,714	$110,215	$106,502	$339,431	1,626,687	31
Aids to navigation [c]	1,423,248	242,264	363,619	13,591	2,042,722	317,584	520,692	340,150	1,178,426	3,221,148	62
Total	2,448,909	443,759	787,823	31,356	3,711,847	441,298	630,907	445,652	1,517,857	5,229,704	100

TOTAL COSTS OF DETAILED FEATURES.

Offices	$326,777		$72,790	$2,134	$401,701					$401,701	8
Depots	112,817	$13	42,579	4,284	159,693	$32,055	$18,555	$90,559	$141,169	300,862	5
Tenders:											
Large	171,026	56,388	111,778	3,738	342,930	10,105	10,105		20,210	363,140	7
Medium	377,125	131,772	180,563	6,259	695,719	75,537	75,538	2,552	153,627	849,346	16
Small	37,916	13,322	16,494	1,350	69,082	6,017	6,017	12,391	24,425	93,507	2
Total	586,067	201,482	308,835	11,347	1,107,731	91,659	91,660	14,943	198,262	1,306,993	25
Light vessels:											
Exposed	156,420	37,262	43,058	1,693	238,433	37,193	37,194	1,039	75,426	313,859	6
Moderately exposed	97,869	25,545	15,251	522	139,187	31,658	31,658		63,316	202,503	4
Relief	41,360	10,194	13,492	627	65,673	17,217	17,216	16,534	50,967	116,640	2
Lakes	38,989	10,701	6,884	185	56,759	4,785	4,784	18,953	28,522	85,281	1
Total	334,638	83,702	78,685	3,027	500,052	90,853	90,852	36,526	218,231	718,283	13

[a] Includes offices, except expenses of publications and general freight accounts.
[b] Includes depots and tenders; also items excepted above, charged to supplies.
[c] Includes light vessels, light stations, minor fixed aids, and buoys.

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SUMMARY OF COSTS, LIGHTHOUSE SERVICE, FISCAL YEAR ENDED JUNE 30, 1913—Continued.

TOTAL COSTS OF DETAILED FEATURES—Continued.

Feature.	Maintenance expenses.					Betterment expenses.				Grand total.	Per cent.
	Salaries.	Rations.	General supplies.	Incidental expenses.	Total.	Repairs and improvements.		Works under special appropriations.	Total.		
						Labor.	Materials and supplies.				
Light stations:											
First order	$113,204	$20,258	$33,304	$2,224	$168,990	$22,492	$28,254	$20,790	$71,536	$240,526	5
Second order	42,920	7,708	11,166	152	61,946	7,010	9,454	73,723	90,187	152,133	3
Third order	89,120	16,692	26,276	1,858	133,946	13,319	14,222	18,766	46,307	180,253	3
Three and one-half order	18,976	3,777	3,709	54	26,516	3,119	2,320	.....	5,439	31,955	1
Fourth order	321,395	62,554	75,504	2,761	462,214	79,590	65,847	128,504	273,941	736,155	14
Total	585,615	110,989	149,959	7,049	853,612	125,530	120,097	241,783	487,410	1,341,022	26
Minor fixed aids:											
Fifth order	101,767	20,340	18,221	376	140,704	15,219	12,211	20,724	48,154	188,858	3
Sixth order	41,399	8,267	8,432	170	58,268	9,058	5,752	1,254	16,064	74,332	2
Lens lanterns	90,231	11,665	15,211	1,292	118,399	17,005	13,851	13,221	44,077	162,476	3
Post lights	235,911	2,200	25,579	602	264,292	25,190	14,031	179	39,400	303,692	6
Other lights	30,550	4,686	14,258	400	49,894	24,357	44,652	25,820	94,829	144,723	3
Daymarks, etc	3,137	415	1,385	559	5,496	10,372	11,054	513	21,939	27,435	1
Total	502,995	47,573	83,086	3,399	637,053	101,201	101,551	61,711	264,463	901,516	18
Buoys:											
Lighted	.....	.....	28,393	291	28,684	.....	126,376	.....	126,376	155,060	3
Unlighted	.....	.....	23,496	cr. 175	23,321	.....	81,816	130	81,946	105,267	2
Total	.....	.....	51,889	116	52,005	.....	208,192	130	208,322	260,327	5
Grand total	2,448,909	443,759	787,823	31,356	3,711,847	441,298	630,907	445,652	1,517,857	5,229,704	100

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SUMMARY OF COSTS, LIGHTHOUSE SERVICE, FISCAL YEAR ENDED JUNE 30, 1913—Con.

AVERAGE COSTS OF SELECTED FEATURES.

Average cost of—	Salaries.	Rations.	Illuminants.	Fuel.	Other supplies.	Incidentals.	Total maintenance.	Repairs and improvements.	Total.
District office, exclusive of third	$11,775	.....	.....	.....	$1,647	$112	$13,534	.....	$13,534
District depot, exclusive of third	3,636	.....	.....	.....	1,181	79	4,896	$2,917	7,813
Large tender, Pacific	22,712	$6,059	.....	$10,488	3,914	385	43,558	2,247	45,805
Large tender, Atlantic	17,081	6,207	.....	8,425	3,046	157	34,916	2,548	37,464
Medium tender	13,437	4,695	.....	4,460	1,977	224	24,793	4,689	29,482
Exposed light vessel	7,821	1,863	$86	1,224	843	85	11,922	3,719	15,641
Moderately exposed light vessel	4,449	1,161	79	285	329	24	6,327	2,878	9,205
Lake light vessel	3,249	892	27	356	191	15	4,730	797	5,527
First-order light stations with fog signals	2,445	425	222	350	338	59	3,839	1,003	4,842
First-order light stations without fog signals	1,760	321	143	98	203	32	2,557	845	3,402
Fourth-order light stations with fog signals	1,403	277	45	306	123	19	2,173	665	2,838
Fourth-order light stations without fog signals	680	132	31	49	51	8	951	407	1,358
Lens lantern	206	27	15	8	12	3	271	a 41	312
Minor light, river districts	80	.....	2	.....	4	.....	86	a 8	94
Minor light, other districts	110	2	7	1	9	.....	129	a 13	142
High-pressure acetylene light	29	3	24	3	3	2	64	a 125	189
High-pressure acetylene buoy	.....	.....	48	.....	b 82	1	131	a 67	c 198
Low-pressure acetylene buoy	.....	.....	78	.....	b 47	3	128	a 30	c 158
Oil-gas buoy	.....	.....	35	.....	b 30	1	66	a 31	c 97

a Figures do not include establishment of new aids.
b Figures include transportation charges of all kinds, such as freight on new buoys, etc.
c Figures do not include renewal of appendages.

ENGINEERING AND CONSTRUCTION.

A number of new works under special appropriations were completed during the fiscal year. Those of principal importance are as follows: New fog signal at Manana Island, near Monhegan Island, Me.; wharf, power house, and foundry at the general lighthouse depot, Tompkinsville, N. Y.; new light and fog bell at Negro Point, East River, N. Y.; new lighthouse at Miah Maull Shoal, Delaware Bay, N. J.; a portion of new lights for Cape Fear River, N. C.; new lighthouse and fog signal, with minor lights, at Superior Entry, Wis.; beacon lights and buoys for Livingstone Channel, Detroit River, Mich.; 13 new acetylene lights in Alaska; reconstruction of lighthouse and fog signal at Lincoln Rock, Alaska; new light and fog signal, Alki Point, Puget Sound, Wash.; new lighthouse and fog signal at San Pedro Breakwater, Cal.; new fog signal at Point Loma, Cal.; new lighthouse, Kilauea Point, Hawaiian Islands.

Other important work in progress at the close of the fiscal year includes a new light and fog signal at Thimble Shoal, Chesapeake Bay, Va.; new light and fog signal at Brandywine Shoal, Delaware Bay, N. J.; lights and buoys for channels leading to Baltimore, Md.; general improvements at San Juan Depot, P. R.; new light and fog signal at Buffalo Breakwater North End, N. Y.; and new system of lights (43 in all) for St. Marys River, Mich.

The most noteworthy example of construction accomplished during the fiscal year was the construction of foundations for 10 beacon lights marking the Livingstone Channel, Detroit River, Mich. The concrete foundations of 6 of the beacon lights were constructed in

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place in the cofferdam built by the United States Engineer officers for the purpose of taking out the principal rock cut, thus avoiding the heavy expense which would have been incurred had it been necessary to place these foundations under water. The remaining four foundations were constructed by building reenforced concrete cribs at a selected point within the cofferdam, afterwards towing them downstream to their proper positions, sinking them by means of sluice valves provided for the purpose, then pumping out the water from the interior of the cribs and filling them with concrete. This has also proven to be an economical method of construction. Iron ice guards around the water line are provided for all concrete foundations. Acetylene illumination was provided for the beacon lights.

A new type of cast-iron mast supporting a cylindrical tank shelter, surmounted by an acetylene lantern, has been developed and installed in exposed positions on breakwaters, which in times of storm are swept by the sea, to a depth of 10 feet. The structures have withstood this test and have given general satisfaction.

Old wooden beacons have been replaced by concrete structures, which have been found superior in resisting ice damage. In one case, where in former years the old wooden rock-filled crib was overturned by ice every winter, a concrete structure has now stood without damage for two years.

Some experimenting and work has been done with oil concrete—Portland cement concrete with addition of a paraffin base residue mineral oil—and the results have so far been satisfactory in preventing leakage or absorption.

A tripod beacon was built of reenforced concrete in place of wood, and work on another was nearly completed. A much more durable and permanent construction has been effected, and other beacons of this type will be built in the future.

To lessen possible damage from fire at light stations a number of isolated oil houses have been built during the year for the storage of inflammable supplies.

A standard legend to be placed on all drawings, tracings, and blue prints made throughout the Service was developed during the year.

Standard photolithograph drawings and instructions covering various types of incandescent oil vapor lamps were issued during the year, to be placed in a proper place for ready reference by keepers and other employees charged with the use of same.

Arrangements were made to provide each district office with a small collection of modern technical reference books for use in designing and other engineering work of the Service.

IMPROVEMENT OF APPARATUS AND EQUIPMENT.

Until lately it has been necessary to procure all the cut-glass lenses used in the Lighthouse Service from either France, England, or Germany, most of them coming from France. Recently the matter was taken up with an American firm of glass manufacturers with a view to ascertaining if a better lens could not be made in this country than abroad by using some modern manufacturing methods. The results to date have proven satisfactory. The

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lenses are superior to those purchased abroad and can be made for the same cost or less. The essential feature of the American method of manufacture is that the prisms are formed by machines instead of by hand. Every part is made to fit an accurate template or jig, so that they are true to size, and parts of the same number are completely interchangeable. It is hoped that in a short time American factories will be equipped to furnish all lenses except those of large size, for which the demand is so small as not to warrant the large equipment cost necessary.

Improvements have been made in pressed glass lens lantern and buoy lantern lenses, and tests show them well adapted for many conditions of the Service, at a decrease in expense.

Efforts with a view to the standardization of articles manufactured at the general lighthouse depot, Tompkinsville, N. Y., were continued. Practically all articles manufactured at that depot are now made from jigs and templates, so that all parts are duplicate and interchangeable. The making of proper tools and installation of modern machinery is still in progress, and it is expected to reduce costs of manufacture further.

Wick lamps have been gradually replaced by incandescent oil vapor installations at a number of important stations, thereby producing a much brighter and more efficient light, which has proven satisfactory to mariners and elicited favorable comments from them.

A device to call the attention of the keeper to any abnormal condition of his light has been prepared and fitted to a third-order vapor lamp. It consists of a recording thermometer with electrical connections to ring alarm bells where required when the light burns either too low or too high, and also keeps a chart record showing the operation of the light. Its use tends to greater attention on the part of keepers to insure uniform illumination. Other devices designed for the purpose of summoning the light keeper in case his light is not burning properly are being tried.

Experiments have been made with new types of post lanterns, and a lantern has been developed which it is believed will be an improvement.

Experiments have been made for the improvement of lens clocks or revolving apparatus, and a clock that is believed to be superior is being manufactured.

The use of devices to prevent birds from resting on buoys and discoloring them has been extended during the year.

An improved type of torch for starting oil engines has been designed.

A vapor lamp using three 55-millimeter mantles has been developed, for use in first and second order lenses, that gives promise of operating successfully.

Some improvements have been made in the construction of single oil vapor lamps in the direction of better control and simplification of cleaning operations.

The question of installing acetylene fog guns for trial at several light stations in this Service is under consideration. These fog guns were tried recently by the Scotch Lighthouse Service with apparently satisfactory results.

Experiments testing the efficiency of radio installations as fog-signal apparatus are under consideration and it is expected will be started during the next fiscal year.

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The purchase of a diaphone fog signal was made during the year. This device is actuated by the escape of the air through the slots in a reciprocating piston instead of through a rotor, as in the case of a siren.

A test installation has also been made of a sireno which is a patented rotary blower for producing sound and is operated by an electric motor.

Improvements have been made in the use of parabolic reflectors by the adoption of a concentrated filament electric lamp and the utilization of a low-voltage current to obtain the maximum efficiency of this lamp.

With a view to maintaining a horizontal direction of beams of light at all times, regardless of the rolling of light vessels, a knife-edge suspension for lenses and reflectors on such vessels has been introduced.

APPROPRIATIONS AND EXPENDITURES.

The appropriations for the maintenance of the Lighthouse Service for the fiscal year 1914 were $5,071,930, being $34,520 in excess of those for the preceding fiscal year. The estimates for maintenance appropriations for 1914 were divided into one appropriation for general expenses of supplies, repairs, etc., and three appropriations for salaries, with an alternative providing for all maintenance appropriations in a single item. This alternative proposition was not authorized by Congress. It is believed, however, that with this form of appropriation a more economical and efficient administration of the Lighthouse Service could be effected, and in the estimates for the next fiscal year attention has been drawn to the fact. The appropriations for special works made for the fiscal year 1914 amounted to $722,600. The average appropriations for special works for the 10 preceding years, 1904 to 1913, inclusive, amounted to $990,752.

The detailed estimates for the fiscal year 1915 are given on page 389. The total amount for general maintenance is $200,100 more than the appropriation for the present year. The estimate for the Bureau of Lighthouses in Washington is $480 less than the appropriation for the preceding year. Estimates for 29 special works have been submitted, aggregating $1,635,500, considering only certain works authorized by Congress for which no appropriations have been made, and groups 1 and 2. This is $912,900 more than the appropriation for special works for the preceding year, and includes a number of important works for which estimates were submitted last year, but which were not included in the appropriations. The estimates include three new lighthouse tenders, one new light vessel, three new light and fog signal stations, two new light stations, one new lighthouse depot, five items for establishing or improving aids in general localities, one item for a new system of harbor or channel lights and other aids, eight items for improvements of light or fog signal stations or of groups of aids to navigation, four items for improvement of lighthouse depots, and one item for light keepers' dwellings.

In selecting and submitting estimates for those special works believed to be most important there were considered estimates submitted by officers in the various districts for new lighthouse and ship construction aggregating about $3,980,000. Many items not included in the estimates for this year are thought to be meritorious, and the more important of them are included in group 3 of the esti-

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mates for special works, submitted for consideration as the resources of the Government permit them to be taken up. Explanation of the necessity for each of the items of special works is included with the estimates.

The following tables give comparisons of appropriations and expenditures for the Lighthouse Service, beginning with the fiscal year 1910 and including the estimates for 1915.

APPROPRIATIONS, LIGHTHOUSE SERVICE, FISCAL YEARS 1910–1914, WITH ESTIMATES FOR 1915.

[The salaries and allowances of officers of the Navy and Army on duty with the Lighthouse Board and the Lighthouse Service are not included in this table.]

Item.	Appropriations.					Estimates, 1915.
	1910	1911	1912	1913	1914	
MAINTENANCE.						
Salaries, Lighthouse Board and Bureau of Lighthouses	$48,720	$64,840	$64,630	$64,630	$64,510	$64,030
Supplies of lighthouses	726,000	310,000	.....	.....	.....	.....
Salaries of keepers of lighthouses	1,250,000	1,250,000	930,000	930,000	930,000	940,000
Expenses of light vessels	963,800	650,000	.....	.....	.....	.....
Expenses of buoyage	926,000	400,000	.....	.....	.....	.....
Lighting of rivers	375,000	250,000	.....	.....	.....	.....
Repairs, etc., of lighthouses	950,000	625,000	.....	.....	.....	.....
Expenses of fog signals	290,000	200,000	.....	.....	.....	.....
Oil houses for light stations	10,000	10,000	.....	.....	.....	.....
Southeast Shoal Light Vessel, Lake Erie	4,000	4,000	.....	.....	.....	.....
Great Lakes Channel lights	4,000	4,000	.....	.....	.....	.....
Neebish Channel lights, St. Marys River, Mich	3,000	3,000	.....	.....	.....	.....
Maintenance of lighthouse tenders	.....	1,260,000	.....	.....	.....	.....
Repairs to lighthouse tenders	.....	160,000	.....	.....	.....	.....
Repairs of light vessels	.....	130,000	.....	.....	.....	.....
Pay of clerks, Lighthouse Service	.....	150,270	.....	.....	.....	.....
General expenses, Lighthouse Service	.....	.....	2,569,400	2,609,400	2,750,000	2,845,000
Salaries, lighthouse vessels	.....	.....	1,007,420	957,420	967,420	1,038,000
Salaries, Lighthouse Service	.....	.....	465,960	475,960	360,000	385,000
Total for maintenance	5,550,520	5,471,110	5,037,410	5,037,410	5,071,930	5,272,030
Unexpended balances (obligations estimated)	323,802	369,668	125,400	73,742	.....	.....
SPECIAL WORKS.						
Light and fog signal stations	296,000	68,000	810,950	146,500	465,100	862,500
Light vessels	.....	.....	75,000	380,000	125,000	125,000
Lighthouse tenders	112,000	.....	7,000	.....	.....	342,000
Keepers' dwellings	.....	.....	.....	.....	.....	83,000
Buoys	40,000	.....	.....	.....	7,500	10,000
Lighthouse depots	.....	.....	100,000	.....	125,000	213,000
Total for special works	448,000	68,000	992,950	526,500	722,600	1,635,500
Total maintenance and special works	5,998,520	5,539,110	6,030,360	5,563,910	5,794,530	6,907,530

EXPENDITURES FROM APPROPRIATIONS, LIGHTHOUSE SERVICE, FISCAL YEARS 1909–1913.

[Actual expenditures, regardless of year of appropriation.]

Expenditures—	1909	1910	1911	1912	1913
For maintenance	$4,666,093	$5,032,312	$5,046,063	$5,058,048.86	$5,037,777.87
For special works	1,719,788	706,377	414,296	310,884.98	461,627.02
Total	6,385,881	5,738,689	5,460,359	5,368,933.84	5,499,404.89

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DEPOTS.

The Lighthouse Service maintains 44 depots in the various districts for the storage and distribution of supplies and for other purposes. During the year one lighthouse depot, that at Tonka, Alaska, was discontinued. Since the close of the year Congress has made an appropriation of $125,000 for a depot in the sixth district, to replace the present depot at Castle Pinckney, Charleston Harbor, which owing to its exposed position is unsatisfactory, and measures are being taken to determine the best site in this district for a depot.

Improvements were made at depots in the following districts during the year:

In the third district a concrete extension to one of the wharves at the general lighthouse depot, Tompkinsville, N. Y., was completed.

In the fourth district, at Edgemoor depot, Del., the reconstruction of the two wharves was completed, and a stone sea wall constructed.

In the ninth district improvements were made to that part of the old naval reservation set aside as a lighthouse depot and headquarters of the district by proclamation of the President dated January 26, 1912.

In the sixteenth district, by Executive order of April 20, 1912, the President reserved a site for a lighthouse depot near Ketchikan, Alaska, but it has not been decided that it will be economical to improve this at present.

In the following districts provision should be made for improved depot facilities:

In the second district the present depot at Lovells Island, Boston Harbor, is for a number of reasons unsatisfactory, and Congress has authorized the transfer for this purpose of the old marine-hospital site at Chelsea, Boston. This property is now under lease to private parties. The question of obtaining possession of this or some other suitable site is under consideration.

The depot at Woods Hole, Mass., also in the second district, although well located for the work of the Service in the vicinity, is not as useful as it should be, on account of shallow water around the dock and approaches. Estimates are submitted for dredging the channel and basin around the wharf and for the erection of a brick storehouse to replace the present wooden one.

In the third district estimates are submitted for the construction of a carpenter shop and for improvement to the offices and laboratory.

In the eleventh district estimates are submitted for repairs and improvements at the depot at Detroit, Mich.

The headquarters of the twelfth district were moved from Chicago, Ill., to Milwaukee, Wis., on September 17, 1913. The present depot is practically surrounded by coal yards and the coal dust is objectionable. Estimate has been submitted, to be considered by Congress as resources permit, for the purchase of a new site and construction of a depot.

In the sixteenth district, which in 1910 was organized as a separate lighthouse district, no permanent arrangement has yet been made for a depot, but temporary space is being rented at Ketchikan. An estimate has been submitted, to be considered by Congress as resources permit, for the purchase of a site and the necessary equipment for a lighthouse depot in Alaska.

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In the eighteenth district estimates are submitted, for consideration as resources permit, for repairs and improvements to the Goat Island Depot, Cal.

In the nineteenth district the headquarters of the Lighthouse Service are at Honolulu, and storage facilities are either rented or granted by the courtesy of other branches of the Government. The establishment of a permanent depot in this district would facilitate the work of the Service, and estimates are submitted for that purpose.

LIGHTHOUSE TENDERS.

The tenders of the Service have been employed to the best advantage during the year. The 44 vessels which have been in commission have steamed a total of about 435,000 nautical miles in their work of supplying light stations, maintaining the buoyage system, transporting construction materials, and carrying the officers and employees of the Service to their stations or on inspection duty.

The tender *Thistle* was sold on December 6, 1912, the condition of the vessel being such that it was of no further use to the Service.

Contract was awarded since the close of the year for the single-screw, steam-propelled lighthouse tender *Laurel* for service in the fifth lighthouse district.

The tender *Woodbine* is still under construction and it is expected that it will be ready for service about November, 1913.

An estimate of $325,000 has been submitted for the construction of a tender to replace the *Armeria*, which was wrecked and lost on May 20, 1912. It is proposed to use this tender for general lighthouse work as required, and also for the purpose of transporting supplies to the Pribilof Islands in Bering Sea for use in the Alaska sealing industry, and for use in Alaskan waters in connection with the work of other branches of the Government, so far as may be desirable and practicable.

Authority has been requested to extend the use of the appropriation of $200,000 heretofore made for the construction of two tenders, for the construction of two or more tenders for general service, it being thought that additional small tenders may be constructed out of this appropriation.

With the increase in the number of aids to navigation and the deterioration of older vessels it will probably be necessary to construct on an average one or two new tenders each year. The services of tenders may be somewhat lessened in the future by planning of light vessels that will not use so much coal, as, for instance, by substituting oil fuel and oil engines, or by replacement of present steam-power plants by internal-combustion engines.

The continuance of the plan of systematic docking, painting, and minor repairs to tenders during the year has resulted in higher efficiency and better maintenance.

The following tenders have either been extensively overhauled or such work has been started during the fiscal year 1913: *Amaranth*, *Clover*, *Lilac*, *Madrono*, *Mangrove*, *Myrtle*, and *Pansy*.

It is probable that during the current year extensive overhaul will be completed or undertaken on the following tenders: *Arbutus*, *Crocus*, *Clover*, *Goldenrod*, *Ivy*, *Mangrove*, *Myrtle*, *Oleander*, *Pansy*, *Sunflower*, and *Marigold*.

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The following was the number of tenders of the Lighthouse Service on June 30 of the years specified, omitting boats not having regular crews and those less than 50 feet in length: 1910, 51; 1911, 46; 1912, 45; 1913, 44. On June 30, 1913, the following was the status of the tenders: In actual service, 38; indefinitely laid up, 0; undergoing repairs, 6.

LIGHT VESSELS.

The Lighthouse Service maintains light vessels on 53 stations and has for this purpose 67 light vessels, of which 14 are relief vessels. Some of these vessels are old, 9 having been built over 50 years ago; one is 64 years old. Some of the older vessels are in a condition which does not warrant extensive repairs.

Light Vessel *No. 82*, the new relief for the Lake districts, was completed and on August 3, 1912, was placed, temporarily, on Buffalo Light-Vessel Station, in the eastern end of Lake Erie in the approaches to Buffalo Harbor, pending the construction of *No. 96*, the future ship for this station.

Milwaukee, Wis., Light Vessel *No. 95* was completed after the close of the fiscal year, and placed on station November 30, 1912.

Appropriation was made by Congress after the close of the fiscal year of $125,000 for a light vessel for the Southwest Pass Entrance to the Mississippi River, La., and plans for this vessel, to be designated *No. 102*, are under way. The construction of a light vessel to be placed near Monhegan Island, Me., at a cost of $125,000 was authorized, but no appropriation was made.

Contract has been awarded for the construction of light vessels *No. 96* and *No. 98*, the former to be stationed about 13 miles southwest from Buffalo Harbor North Entrance, and the latter to be used as a relief vessel on the Great Lakes.

Plans are under way for the construction of first-class light vessel *No. 99*, and second-class light vessel *No. 101*.

During the year South Pass Light Vessel, La., was discontinued, the vessel being transferred to Southwest Pass, La., formerly unmarked by a light vessel.

Diamond Shoal Light Vessel *No. 71*, N. C., has been greatly improved by fitting new boilers, compounding the propelling engine, and replacing one of the steam-driven electric generating sets for the signal light and radio service by an oil-engine outfit of the same capacity. The speed of the vessel has been increased, while the coal consumption has been reduced. A further economy has been effected in the avoidance of the dangerous labor of frequently coaling the vessel at sea, as well as in a saving of the time of the tenders and the labor of their crews, as oil is more safely and quickly delivered.

The Bush Bluff Light Vessel, Va., has recently been fitted with a new system of electrical signal light. It consists of one parabolic silvered reflector mounted upon a compound pendulum and revolved by an electric motor to show a flash every 10 seconds. The light is furnished by a concentrated tungsten filament incandescent lamp of 30 candlepower, fixed in the focus of the reflector, and gives a flash estimated at about 80,000 candlepower. The current for the operation of both the lamp and motor is furnished by storage batteries, which are sent ashore for recharging at convenient intervals. This is the first installation of a signal light of this character in the world.

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Regulations providing for the standard painting of underwater surfaces of lighthouse vessels were issued after a number of experiments and service trials of various compositions. These regulations cover the various conditions under which lighthouse vessels must operate, both in salt and fresh water.

Supplementary to these regulations, instructions were also given for the periodic docking of all vessels at regular intervals, depending on type of vessel and locality of station.

Regulations adopted for improvements in the marking of light-vessel stations are described on page 324.

The following light vessels have either been extensively overhauled or such work has been started during the last fiscal year:

No.	No.
41. Hedge Fence Shoal, Mass.	67. Umatilla Reef, Wash.
48. Cornfield Point, Conn.	71. Diamond Shoal, N. C.
53. Relief.	97. Bush Bluff, Va.

It is probable that during the current fiscal year extensive overhaul will be completed or undertaken on the following light vessels:

No.	No.
1. Martins Industry, S. C.	53. Relief.
4. Handkerchief, Mass.	54. Boston, Mass.
43. South Pass, La.	72. Relief.
46. Tail of the Horseshoe, Va.	78. Relief.
48. Cornfield Point, Conn.	83. Blunts Reef, Cal.

The following was the total number of light vessels and stations on June 30 of the years named:

Year.	Light vessels.	Light-vessel stations.
1910	68	54
1911	63	51
1912	65	51
1913	67	53

Of the present light vessels 35 have self-propelling machinery and 31 are provided only with sail power. One (Bush Bluff) has no means of propulsion.

On June 30, 1913, the following was the status of the light vessels: Regular vessels on station, 46; relief vessels on station, 7; relief vessels at depots, 3; regular vessels under repair, 7; relief vessels under repair, 4.

COOPERATION.

Special effort has been continued to consult the needs of maritime interests as to aids to navigation and to cooperate with other branches of the Government having interest in or relations with the work of this Service.

Cooperation with the United States Engineer officers in charge of river improvements in the river districts has been continued, and has proven advantageous in the prompt change of aids when needed by engineer vessels in the vicinity, making it unnecessary to await the arrival of the lighthouse tender. Altered channel conditions

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and the adjustment of aids at the opening of navigation in the spring are thereby handled more expeditiously than in former years.

Arrangements were made with the Navy Department and the Revenue-Cutter Service for the prompt reporting directly to the nearest lighthouse inspector concerned of any deficiencies observed in aids to navigation.

A joint regulation approved by the War Department and the Department of Commerce providing for the marking of wrecks and making arrangements for the removal of same was issued.

Arrangements were also made for general cooperation with the Revenue-Cutter Service and the Office of the Chief of Engineers, War Department, for the removal of wrecks, derelicts, and other obstructions to navigation. The commanding officers of revenue cutters will promptly notify the nearest lighthouse inspector whenever wrecks are buoyed or lighted by vessels of the Revenue-Cutter Service, in order that such information may be published in the weekly Notice to Mariners.

SAVING OF LIFE AND PROPERTY.

During the fiscal year 1913 services in saving of life and property were rendered and acts of heroism performed by employees of the Lighthouse Service on vessels or at stations on 92 occasions, a list of which is given on page 378.

REPORT OF OPEN-MARKET PURCHASES.

In compliance with the act of June 17, 1910, there is submitted separately as a part of this report a list of purchases of materials and supplies for the Lighthouse Service made without obtaining bids under public advertisement, with the reasons for so purchasing.

LEGISLATION ENACTED AFFECTING THE LIGHTHOUSE SERVICE.

The following is a summary of special legislation affecting the Lighthouse Service enacted at the third session of the Sixty-second Congress, and, since the close of the fiscal year, at the first session of the Sixty-third Congress. Legislation enacted within this fiscal year at the second session of the Sixty-second Congress is included in the Annual Report for 1912:

The purchase for lighthouse purposes of approximately one-half acre of land in the vicinity of the lighthouse reservation at Port Ferro Light Station, P. R., for the purpose of constructing a watershed and cistern, and making the appropriation "General expenses, Lighthouse Service," for the fiscal year in which the purchase is effected, available therefor, was authorized by the act of March 4, 1913.

The purchase of necessary additional land for light stations and depots, under rules prescribed by the Secretary of Commerce, was authorized by the act of March 4, 1913, no single acquisition of such additional land to cost in excess of $500. Authority was later given by the act of October 22, 1913, for the payment for such land to be made from the appropriation "General expenses, Lighthouse Service," the total sum to be expended for this purpose in any fiscal year to be restricted to $3,000.

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Authority was granted by the act of March 4, 1913, for the furnishing of supplies and equipment for special works of the Lighthouse Service from general stock, and the reimbursement of the appropriation "General expenses, Lighthouse Service," from the respective appropriations for special works.

Authority was granted by the act of March 4, 1913, for the appraisal and sale, either by sealed proposals for the purchase of the same, or by public auction, after advertisement of the sale for such time as in the judgment of the Secretary of Commerce the public interests require; of any condemned supplies, materials, equipment, or land which can not be profitably used in the work of the Lighthouse Service, the proceeds of such sales, after the payment therefrom of the expenses of making the sales, to be deposited and covered into the Treasury as miscellaneous receipts, as now provided by law in like cases.

Authority was granted by the act of July 3, 1912, for the payment of $1,642.55 to the officers and crew of the tender *Manzanita* for personal-property losses sustained by them on the foundering of that tender on October 6, 1905.

Authority was granted by the act of October 22, 1913, to pay a claim in the sum of $22.50 for damages occasioned by a collision for which a vessel of the Lighthouse Service was found to be responsible.

Authority was granted by the act of October 22, 1913, to use the unexpended balance of the appropriation of $15,000 heretofore made for a light and fog signal station at or near the west end of the draw near the Lehigh Valley Railroad bridge at Passaic, N. J., for establishing beacon lights to mark the channel in Newark Bay, N. J.

Appropriations were made for the following authorized special works, by the act of August 24, 1912: A light vessel for general service, $130,000; fog signal and additional keeper's dwelling at Point Loma, Cal., $17,500; and by the act of August 26, 1912—light vessels for general service, $250,000; completion of light and fog signal at Thimble Shoal, Va., $39,000; completion of lights in Cape Fear River, N. C., $30,000; and repairs and improvements to aids in St. Marys River, Mich., $60,000.

Authorization having been given by the act of March 4, 1913, appropriations were made for the following special works by the act of October 22, 1913, subsequent to the close of the fiscal year: Depot for the sixth lighthouse district, $125,000; aids to navigation in Atchafalaya Entrance Channel, La., $50,000; light vessel for the Southwest Pass entrances to the Mississippi River, La., $125,000; light station on Navassa Island, West Indies, $125,000; improvement of aids to navigation at Ashtabula Harbor, Ohio, $45,000; improvement of fog-signal station at Cleveland, Ohio, $17,600; light and fog signal station and improvement of aids to navigation at Lorain Harbor, Ohio, $35,000; aids to navigation at Ashland, Wis., $25,000; pierhead light and lighted buoy at Oconto Harbor, Wis., $5,000; aids to navigation in Manistique Harbor, Mich., $20,000; light and fog signal at or near Cape St. Elias, Alaska, $115,000; aids to navigation and improvement of existing aids in Puget Sound and adjacent waters, Wash., $30,000; improvement of Warrior Rock Light Station, Oreg., $2,000; completion of unfinished portion of Government road from Rollerville to the Point Arena Lighthouse, Cal., $3,000.

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The following additional works were authorized by the act of March 4, 1913, at the limits of cost specified, no appropriations being made: Lighthouse tender for general service, $250,000; light vessel to be placed near Monhegan Island, Me., $125,000; carpenter shop at the general lighthouse depot, Tompkinsville, N. Y., $23,000; light and fog signal station at or near North Farallon Island, Cal., $100,000.

SPECIAL LEGISLATION NEEDED.

The following additional legislation for the Lighthouse Service is considered desirable:

The salaries of lighthouse inspectors are, by the act of June 17, 1910, limited to $2,400 a year, except the inspector of the third district, whose salary is fixed at $3,600. The salary of $2,400 is inadequate because of the heavy responsibilities with which the inspector is charged and the technical and business ability required to successfully discharge the duties. The compensation of these positions should be sufficient to bring into and retain in the Lighthouse Service a class of persons fully competent to efficiently conduct such important work. The inspectors should be men of high character and qualifications, including technical knowledge as to engineering and nautical affairs, and should have business ability. Authority has been asked for an increase in the compensation of inspectors, except in the third district, to not exceed $2,700 each per annum. The maximum total increase in compensation under this change is $4,800.

Recommendation is made that the Secretary of Commerce be authorized to increase the pay of crews of lighthouse vessels as may be necessary to secure competent service, and the Department has submitted an estimate to increase the appropriation for salaries, lighthouse vessels, in order that more adequate pay may be given to the crews of lighthouse vessels. There has been increasing difficulty in obtaining competent seamen, and others of crews for such vessels in recent years, and as a result lighthouse tenders engaged on important buoy work have during the past season in some cases not been able to maintain full crews or have had their crews made up largely of inexperienced men. This condition is believed to be due to the fact that the pay of these crews, and particularly of the seamen, has not been increased for a number of years, whereas pay in other Government services, and in the merchant marine generally, has been raised; for instance, the pay of seamen in the Revenue-Cutter Service on the Atlantic coast was increased by 20 per cent five years ago, and is now that much higher than the similar pay in the Lighthouse Service, and in addition such seamen receive an allowance for uniforms and for reenlistment. The work of seamen on tenders of the Lighthouse Service is unusually severe, and thoroughly competent men are required to render these vessels efficient on the important work in which they are engaged.

Recommendation is made that employees of the Service compensated at a per diem rate be granted 15 working days' leave of absence, including sick leave, each year without forfeiture of pay during such absence, no such employee to be entitled to any leave until he has served 12 consecutive months, when he may be granted 15 days' leave; and during the second or any subsequent year 15

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days' leave at the rate of one and one-fourth days per month, as earned, to be granted from the beginning of the second service year, within the discretion of the lighthouse inspector as to the time when the leave can be allowed without detriment to the Service. It is believed that the granting of this leave would be of benefit to both the employees and the Lighthouse Service.

Recommendation is made that authority be granted to establish and maintain post-lantern lights and other aids to navigation, out of the annual appropriations for the Lighthouse Service, on Lakes Okechobee and Hicpochee and connecting waterways across the State of Florida. The lighting of rivers or inland waters is limited to those specifically authorized by Congress, and such authority has not been granted for the waters specified. Petitions of maritime interests in these localities have urged the establishment of lights, and investigation by the Lighthouse Service has found the same to be warranted.

There is great need for provision by law for the retirement of employees of the Lighthouse Service who after long service have lost their ability for active duty by reason of age or disability incident to their work. This is essential to full efficiency in the administration of the Service. In the report for 1912 a statement was given showing the practice in a number of important foreign countries with reference to the pensioning of employees in the respective lighthouse services in common with other civil employees in those countries, from which it appears that a retirement system is in force with favorable results under all of the other governments mentioned.

The statistics as to the various classes of aids to navigation and fuller details on many of the subjects mentioned in this report will be found in the pages following.

Respectfully,

GEORGE R. PUTNAM,
Commissioner of Lighthouses.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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STATISTICS AND ESTIMATES.

LIST OF OFFICERS OF THE BUREAU OF LIGHTHOUSES AND THE LIGHTHOUSE DISTRICTS.

OFFICERS OF THE BUREAU OF LIGHTHOUSES ON JUNE 30, 1913.

George R. Putnam.....Commissioner of Lighthouses.
John S. Conway.....Deputy Commissioner.
H. B. Bowerman.....Chief Constructing Engineer.
George Warrington.....Superintendent of Naval Construction.

Principal Assistant Engineer, Edward C. Gillette.
Inspector for general duty, E. M. Trott.
Examiner, Fred C. Ruffhead.

INSPECTORS IN CHARGE OF LIGHTHOUSE DISTRICTS JULY 1, 1912, TO NOV. 1, 1913.

District.	Name.	From—	To—
1st...	C. E. Sherman	July 17, 1911	
2d...	R. H. Goddard	June 27, 1912	
3d...	J. T. Yates	June 20, 1912	
4th...	T. J. Rout	Mar. 1, 1912	
5th...	E. C. Ruland	May 1, 1912	
6th...	H. D. King	Apr. 15, 1912	
7th...	W. C. Dibrell	....do.....	Aug. 21, 1913
	W. W. Demeritt	Aug. 22, 1913	
8th...	B. B. Dorry	June 6, 1912	
9th...	Lieut. C. M. Austin, U. S. Navy	June 2, 1911	Aug. 6, 1912
	C. A. Lamy	Aug. 7, 1912	
10th..	Roscoe House	June 4, 1912	
11th..	Commander C. M. McCormick, U. S. Navy	Nov. 15, 1910	Aug. 18, 1912
	E. L. Woodruff	Aug. 19, 1912	
12th..	Lieut. Myles Joyce, U. S. Navy	July 1, 1911	Aug. 15, 1912
	L. M. Stoddard	Aug. 16, 1912	
13th..	Maj. Charles Keller, Corps of Engineers, U. S. Army	July 31, 1910	Oct. 15, 1913
14th..	Maj. George M. Hoffman, Corps of Engineers, U. S. Army	Oct. 16, 1913	
	Lieut. Col. H. Jervey, Corps of Engineers, U. S. Army	Jan. 17, 1911	
15th..	Lieut. Col. C. L. Potter, Corps of Engineers, U. S. Army	Mar. 31, 1911	July 31, 1912
	Col. C. McD. Townsend, Corps of Engineers, U. S. Army	Aug. 1, 1912	
16th..	R. L. Hankinson	Mar. 23, 1912	Aug. 21, 1913
	W. C. Dibrell	Aug. 22, 1913	
17th..	H. L. Beck	July 6, 1911	
18th..	H. W. Rhodes	July 6, 1912	
19th..	Lieut. Leo Sahm, U. S. Navy	Nov. 9, 1910	Sept. 2, 1912
	A. E. Arledge	Sept. 3, 1912	

JURISDICTION OF LIGHTHOUSE SERVICE.

The United States Lighthouse Service is charged with the establishment and maintenance of aids to navigation and with all equipment and work incident thereto on the sea and lake coasts of the United States, on the rivers of the United States so far as specifically authorized by law, and on the coasts of all other territory under the jurisdiction of the United States, with the exception of the Philippine Islands and Panama. In the Philippine Islands the lighthouse service is maintained by the insular government and supported entirely out of the revenues of the islands. Within the American jurisdiction of the Canal Zone, Panama, on the Atlantic coast there are now two lights, one of which is maintained under a former concession from the United States of Colombia and the other by the Panama Railroad Co. On the Pacific coast there are several smaller lights maintained by the Isthmian Canal Commission. This commission is also arranging for the lighting of the canal and approaches under the general appropriations for the construction of the canal.

All the work of establishing and maintaining the aids to navigation under the jurisdiction of the Lighthouse Service is performed directly by that Service through district organizations, with the exception of a few minor aids, which are maintained by contract, and the exception of the American Samoan Islands, the island of Guam,

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and Guantanamo, Cuba, where the aids are maintained under the supervision of the naval commandants under allotments made from the appropriations for the Lighthouse Service. The Lighthouse Service also has supervision over the establishment and maintenance of private aids to navigation.

At the present time the United States assists in the maintenance of but one lighthouse outside of its territory, this being at Cape Spartel, Morocco. This light is maintained in accordance with the convention between Morocco and the United States, Austria, Belgium, Spain, France, Great Britain, Italy, Netherlands, Portugal, and Sweden, in force since March 12, 1867. The lighthouse was constructed at the expense of Morocco, but it is maintained by the other contracting powers. The annual appropriation by the United States for this purpose is $325, and it is not under the control of the Lighthouse Service.

The jurisdiction of the Lighthouse Service over rivers not included in tidewater navigation is restricted to such as are specifically named in the various acts of Congress. These now include practically all the important navigable rivers and lakes of the country.

The following table shows the coast line of the United States and territories under the jurisdiction of the United States, that designated general coast line being measured by steps of 30 miles, and that designated detailed coast line by steps of 3 miles; there are also given the lengths of the coastal and interior rivers and tributaries so far as they are lighted.

	General coast line.	Detailed coast or channel line.
	Statute miles.	*Statute miles.*
Atlantic and Gulf coasts of the United States	3,480	9,732
Pacific coast of the United States	1,404	3,294
Porto Rico, adjacent United States islands, and Guantanamo	374	449
Great Lakes and connecting waters, United States portion	2,520	4,020
Alaska	7,300	22,654
Hawaiian Islands to Midway Islands	788	1,018
Guam	86	92
American Samoan Islands	76	91
Total coast line under United States Lighthouse Service	16,028	41,350
Coastal rivers on which aids to navigation are maintained by the United States Lighthouse Service (Atlantic and Gulf coasts, 1,374 miles; Pacific coast, 242 miles)	.....	1,616
Interior rivers on which aids to navigation are maintained by the United States Lighthouse Service (Mississippi River, 1,816 miles; Ohio River, 966 miles; Missouri River, 390 miles; other rivers, 690 miles)	.....	3,862
Total coast line and rivers under United States Lighthouse Service	.....	46,828
Philippine Islands (lighted by Philippine Government)	4,080	11,511
Panama Canal Zone (coast line only)	17	40
Total seacoast line under the jurisdiction of the United States (not including Great Lakes and rivers)	17,605	48,881

LIMITS OF LIGHTHOUSE DISTRICTS.

First district.—From the head of navigation on the St. Croix River, Me., the northeastern boundary of the United States, to and including Hampton Harbor, N. H. It embraces all aids to navigation on the seacoast of Maine and New Hampshire and on all tidal waters between the limits named.

Second district.—From Hampton Harbor, N. H., to Elisha Ledge, off Warren Point, R. I., but not including either the harbor or the ledge. It embraces all aids to navigation on the seacoast and tidal waters of Massachusetts, except on the Taunton River and that part of Mount Hope Bay lying within the State boundary.

Third district.—From Elisha Ledge, off Warren Point, R. I., to Cape May, on the coast of New Jersey, excepting Cape May Lighthouse, and to a point on the coast opposite Rehoboth, Del., excepting Cape Henlopen Lighthouse and Hen and Chickens Shoal. It embraces all aids to navigation on the coasts of Rhode Island, Connecticut, New York, and New Jersey northward of Cape May, including Northeast End, Five-Fathom Bank, and Overfalls light vessels, and McCries Shoal, and on all tidal waters tributary to the sea or Long Island Sound between the limits named, together with the aids on Whitehall Narrows, and on the United States waters of Lakes Champlain and Memphremagog.

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Fourth district.—From and including Cape May Light Station, on the coast of New Jersey, to and including Fenwick Island Light Station on the coast of Delaware. It embraces all aids to navigation on the seacoast of New Jersey and Delaware between the points named, the entrance to Delaware Bay, Delaware Bay and River, and the waters tributary thereto, but does not include McCries Shoal, Overfalls Light Vessel, and the aids to navigation seaward thereof, nor the shoals seaward of Fenwick Island.

Fifth district.—From (but not including) Fenwick Island Light Station, on the coast of Delaware, to and including New River Inlet, N. C. It embraces all aids to navigation off the seacoast of Delaware seaward of Fenwick Island, on the seacoasts of Maryland, Virginia, and North Carolina, between the limits named, all of Chesapeake Bay, the sounds of North Carolina, and tributary waters.

Sixth district.—From (but does not include) New River Inlet, N. C., to and including Hillsboro Inlet Light Station, Fla. It embraces all aids to navigation on the seacoasts, bays, sounds, harbors, rivers, and other tidal waters of North Carolina, South Carolina, Georgia, and Florida between the limits named.

Seventh district.—From a point just south of Hillsboro Inlet Light Station to and including Cedar Keys, Fla. It embraces all aids to navigation on the sea and Gulf coasts of Florida, Florida Keys, and on other waters tributary to the sea and Gulf between the limits named.

Eighth district.—From (but not including) Cedar Keys, Fla., to the southern boundary of Texas. It embraces all aids to navigation on the Gulf coast of the United States and tidal waters tributary to the Gulf, between the limits named, together with those on the Mississippi River below and including New Orleans, and on Grand Lake and Lake Chicot.

Ninth district.—The island of Porto Rico and the adjacent islands and other islands and stations ceded to the United States in the West Indies.

Tenth district.—From the mouth of the St. Regis River, St. Lawrence River, N. Y., to the mouth of the Detroit River. It embraces all aids to navigation on the United States shores and waters of Lakes Ontario and Erie and the upper part of the St. Lawrence River and the Niagara River, excepting aids to navigation at the mouth of the Detroit River.

Eleventh district.—From and including all aids to navigation at the mouth of the Detroit River, Mich., to the western end of Lake Superior. It embraces all aids to navigation on the United States shores and waters of Lakes St. Clair, Huron, and Superior, the Detroit River, including the mouth, the St. Clair and St. Marys Rivers, and that part of the Straits of Mackinac lying to the eastward of a line drawn across the straits just to the eastward of Old Macinac Point Light Station, Mich.

Twelfth district.—Includes all aids to navigation on Lake Michigan, Green Bay, and tributary waters lying west of a line drawn across the Straits of Mackinac just east of Old Mackinac Point Light Station, Mich.

Thirteenth district.—The Mississippi River from the head of navigation to the mouth of the Missouri River; the Minnesota River from the head of navigation to its mouth; the Illinois River from the head of navigation to its mouth; the Osage River from the head of navigation to its mouth; the Gasconade River from the head of navigation to its mouth; the Missouri River from the head of navigation to its mouth; St. Croix River and Lake; Lake Traverse; and includes all aids to navigation within these limits and navigable rivers tributary thereto.

Fourteenth district.—The Ohio River from Pittsburgh, Pa., to Cairo, Ill.; the Tennessee River from the head of navigation to its mouth; the Kanawha River from the head of navigation to its mouth; and embraces all aids to navigation within these limits and navigable rivers tributary thereto.

Fifteenth district.—The Mississippi River from and including the mouth of the Missouri River to New Orleans, La.; the Red River from the head of navigation to its mouth; and includes all aids to navigation within these limits and navigable rivers tributary thereto.

Sixteenth district.—From the boundary between Alaska and the Dominion of Canada to the boundary between Alaska and Siberia. It embraces all aids to navigation on the seacoast, bays, rivers, and other tidal waters of Alaska.

Seventeenth district.—From the boundary between California and Oregon to the northern boundary of the United States. It embraces all aids to navigation on the seacoast of Oregon and Washington, on the United States waters of the Strait of Juan de Fuca, Washington Sound, and the Strait of Georgia, and on the tidal waters tributary to the sea, straits, and sounds between the limits named.

Eighteenth district.—From the boundary between California and Mexico to the boundary between California and Oregon. It embraces all aids to navigation on the seacoast, bays, rivers, and other tidal waters of California.

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Nineteenth district.—Embraces the Hawaiian Islands, the Midway Islands, the island of Guam, and the American Samoan Islands, and includes all aids to navigation in the waters thereof.

LOCATION OF DISTRICT OFFICES OF THE UNITED STATES LIGHTHOUSE SERVICE, WITH ADDRESS OF THE LIGHTHOUSE INSPECTOR.

District.	Address.	District.	Address.
1st	Portland, Me., Y. M. C. A. Building.	11th	Detroit, Mich., Post Office Building.
2d	Boston, Mass., 19 Congress Street.	12th	Milwaukee, Wis., Federal Building.
3d	Tompkinsville, N. Y.	13th	Rock Island, Ill., Federal Building.
4th	Philadelphia, Pa., Post Office Building.	14th	Cincinnati, Ohio, Customhouse.
5th	Baltimore, Md., New Customhouse.	15th	St. Louis, Mo., Customhouse.
6th	Charleston, S. C., Old Post Office Building.	16th	Ketchikan, Alaska.
7th	Key West, Fla.	17th	Portland, Oreg., Customhouse.
8th	New Orleans, La., Customhouse.	18th	San Francisco, Cal., Customhouse.
9th	San Juan, P. R.	19th	Honolulu, Hawaii, McCandless Building.
10th	Buffalo, N. Y., Federal Building.		

LIGHTHOUSE DEPOTS MAINTAINED ON JUNE 30, 1913.

[The principal depot of the district is indicated by the larger type.]

District.	Location.	District.	Location.
1st	Bear Island, Me.	8th	Fort San Jacinto, Tex.
	LITTLE DIAMOND ISLAND, ME.		Mobile, Ala.
2d	LOVELLS ISLAND, BOSTON HARBOR, MASS.		PORT EADS, LA.
	Woods Hole, Mass.	9th	Culebrita Island, P. R.
3d	Absecon, N. J.		Guantanamo Bay, Cuba.
	TOMPKINSVILLE, STATEN ISLAND, N. Y.		SAN JUAN, P. R.
	Goat Island, R. I.	10th	BUFFALO, N. Y.
	Juniper Island, Vt.		Erie, Pa.
	New London, Conn.		Maumee Bay, Ohio.
	Tucker Beach, N. J.		Rock Island, N. Y.
4th	EDGEMOOR, DEL.		Sandusky Bay (Cedar Point), Ohio.
	Lewes, Del.	11th	DETROIT, MICH.
5th	Annapolis, Md.		Minnesota Point, Minn.
	Chincoteague, Va.		St. Marys River, Mich.
	Lazaretto Point, Md.	12th	Charlevoix, Mich.
	Point Lookout, Md.		Milwaukee, Wis.
	PORTSMOUTH, VA.		ST. JOSEPH, MICH.
	Washington, D. C.	16th	KETCHIKAN, ALASKA.
	Washington, North Carolina.	17th	Edis Hook, Wash.
6th	CASTLE PINCKNEY, CHARLESTON HARBOR, S. C.		TONGUE POINT, OREG.
7th	Egmont Key, Fla.	18th	GOAT ISLAND, CAL.
	KEY WEST, FLA.	19th	HONOLULU, HAWAII.

EXPLANATION OF TABLE ON PAGE 348.

The table of aids to navigation includes all those maintained by the Lighthouse Service, a total of 13,434. On page 365 are given facts regarding the private aids to navigation, 622 in number, maintained under authority. In the statistics, relief light vessels are not counted and duplicate or auxiliary lights and fog signals are not counted, but double lights are counted separately when maintained on distinct structures or for distinct purposes. Buoys for the purpose of marking the positions of light vessels or larger buoys are not counted. Fog signals at light stations or on vessels are counted as separate aids, but not those attached to buoys, except in the case of submarine bells, which are counted as separate signals, whether on vessels or on buoys. Otherwise each buoy is counted only once, and if it is included in a higher class it is not in the lower class. Light-vessel lights are not counted separately.

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AIDS TO NAVIGATION MAINTAINED BY THE UNITED STATES LIGHTHOUSE SERVICE JUNE 30, 1913.

[See note on p. 347.]

Class.	1st dist.	2d dist.	3d dist.	4th dist.	5th dist.	6th dist.	7th dist.	8th dist.	9th dist.	10th dist.	11th dist.	12th dist.	13th dist.	14th dist.	15th dist.	16th dist.	17th dist.	18th dist.	19th dist.	Total.
LIGHTED AIDS.																				
Hyper-radiant lights	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
First-order lights	2	5	5	2	8	8	6	3	0	0	0	0	0	0	0	0	9	9	0	57
Second-order lights	7	3	2	0	0	2	1	2	1	0	3	2	0	0	0	0	0	1	2	26
Third-order lights	6	1	4	3	0	4	4	7	6	5	10	9	0	0	0	4	2	4	1	70
Three-and-one-half-order lights	0	2	1	0	0	1	0	3	2	3	5	2	0	0	0	0	0	0	0	19
Fourth-order lights	33	25	57	10	48	3	5	12	1	23	44	37	0	0	0	4	14	20	4	340
Fifth-order lights	20	16	17	7	23	4	1	13	2	12	17	13	0	0	0	0	2	3	1	151
Sixth-order lights	1	5	26	2	9	1	0	0	5	13	8	17	0	0	0	0	0	0	0	87
Range-lens lights	0	0	9	11	2	4	0	0	0	2	0	0	0	0	0	0	2	0	0	30
Reflector lights	2	11	1	11	10	40	0	2	0	0	18	1	0	0	0	0	0	0	0	96
Lens-lantern lights	8	12	41	12	47	42	41	140	13	24	76	44	0	0	0	52	17	29	42	640
Minor lights	1	13	171	23	225	166	15	60	0	1	98	4	451	567	607	28	225	11	0	2,666
Electric lights without lens	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	3	1	14
Light-vessel stations	1	11	10	0	8	4	0	2	0	1	5	6	0	0	0	0	3	2	0	53
Gas-lighted buoys	4	36	50	7	40	4	1	18	0	27	68	15	0	0	0	0	6	4	4	284
Gas and whistling buoys	6	3	9	0	6	5	1	3	0	0	1	0	0	0	0	0	5	5	0	44
Gas and aerial bell buoys	0	4	13	4	6	3	0	0	0	3	10	15	0	0	0	0	0	2	0	60
Float lights	0	0	0	0	0	0	0	0	0	0	0	0	58	37	0	5	0	0	1	101
Total	92	148	416	92	432	291	75	265	30	114	363	165	509	604	607	93	293	93	57	4,739
Lights on fixed aids	81	94	334	81	372	275	73	242	30	82	279	129	451	567	607	88	279	80	52	4,196
Lights on floating aids	11	54	82	11	60	16	2	23	0	32	84	36	58	37	0	5	14	13	5	543
Total lighted aids	92	148	416	92	432	291	75	265	30	114	363	165	509	604	607	93	293	93	57	4,739
UNLIGHTED AIDS.																				
Fog signals, engine power	20	21	37	4	14	4	0	3	0	10	39	47	0	0	0	9	23	28	0	259
Fog signals, clock power	35	13	60	8	70	2	0	13	0	4	9	8	0	0	0	1	4	8	0	235
Fog signals, hand power	13	2	3	0	0	0	1	0	0	0	2	1	0	0	0	0	0	0	8	22
Fog signals, electric	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	4
Submarine signals	1	8	8	0	7	3	0	2	0	1	5	5	0	0	0	0	4	2	0	46
Buoys, whistling (unlighted)	19	10	7	0	4	7	2	5	1	0	0	0	0	0	0	0	7	19	3	84
Buoys, bell (unlighted)	43	29	51	6	23	9	6	14	4	0	1	2	0	0	0	2	10	15	1	216
Buoys, iron	132	81	149	118	279	279	221	165	79	14	25	26	0	0	0	83	124	49	47	1,871
Buoys, spar (wood)	668	532	742	91	941	8	0	37	0	151	489	91	344	0	0	51	129	26	3	4,303
Daymarks, beacons, etc	192	88	52	3	191	307	93	110	0	0	3	1	415	59	0	40	52	35	14	1,655
Total unlighted aids	1,123	785	1,109	230	1,529	619	323	349	84	180	573	181	759	59	0	186	354	184	68	8,695
Grand total	1,215	933	1,525	322	1,961	910	398	614	114	294	936	346	1,268	663	607	279	647	277	125	13,434

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DETAILS AS TO CHARACTERISTICS OF LIGHTS (NOT INCLUDING LIGHT VESSELS).

	1st dist.	2d dist.	3d dist.	4th dist.	5th dist.	6th dist.	7th dist.	8th dist.	9th dist.	10th dist.	11th dist.	12th dist.	16th dist.	17th dist.	18th dist.	19th dist.	Total.
Fixed white:																	
Sixth order and above	30	32	56	17	97	36	5	24	7	23	31	21	6	10	4	1	400
Lights below the sixth order	2	10	88	14	167	110	33	107	5	6	87	7	25	172	13	18	865
Lighted buoys		1	5					2				1	2	1			12
Fixed red:																	
Sixth order and above	14	15	23	2	26	15		6	2	12	33	22		1		2	182
Lights below the sixth order	6	15	109	12	57	88	23	90	8	10	72	29	3	74	27	15	638
Lighted buoys		3	6					1					2			1	13
Flashing or occulting:																	
Sixth order and above	15	16	40	27	17	13	10	9	3	21	27	15	2	17	31	6	269
Lights below the sixth order	2		15	9		10		3		9	15	12	52	2	3	10	142
Lighted buoys	10	39	61	11	52	12	2	18		30	79	29	1	10	11	4	360
Fixed and flashing, sixth order and above	12	6	3		8	3	2	3	5	2	4	13		3	2		76
Candlepower:																	
50,000 to 190,000	5	3	3	3	6	6	3	5		3	6	3		5	9	2	62
200,000 to 490,000	3	4	2	2		4	3	4	1	1	4	1		1	2	2	35
500,000 and over	1	1	2		2	1	3				2	1	1	1	3		18
Twin light stations	2	3															5
Stations with resident keepers	70	52	113	33	96	28	15	49	15	40	81	73	9	34	40	16	764

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DETAILS AS TO ILLUMINANTS OF LIGHTS (NOT INCLUDING LIGHT VESSELS).

	1st dist.	2d dist.	3d dist.	4th dist.	5th dist.	6th dist.	7th dist.	8th dist.	9th dist.	10th dist.	11th dist.	12th dist.	16th dist.	17th dist.	18th dist.	19th dist.	Total.
Incandescent oil vapor	23	20	36	15	16	12	11	9	2	3	17	11	1	21	28	4	229
Oil (wick lamps):																	
Sixth order and above	48	43	80	21	84	48	4	33	15	44	79	69	7	6	7	4	592
Lights below the sixth order	7	25	190	25	257	198	56	153	13	16	158	27	32	239	37	32	1,465
Acetylene:																	
Sixth order and above		1	1	10		6	2			10	4	1		2	1	1	39
Lights below the sixth order	2		23	10	2	10		47		10	10	18	53	3	3	10	201
Lighted buoys	5	10	21	1	15	12	1	2			17	1		7	4	4	100
Oil gas:																	
Lights with mantles											8						8
Lights without mantles												3					3
Lighted buoys with mantles	1	1	23		17			1		30	62	28			6		169
Lighted buoys without mantles	4	32	29	10	20		1	18				1		4	1		120
Electric arc:																	
Sixth order and above		2	1												1		4
Lights below the sixth order	1	1												2		1	5
Electric incandescent:																	
Sixth order and above											2						2
Lights below the sixth order			2								1			6	3	1	13
Gas (coal), sixth order and above		2				1											3
Gas (oil), below the sixth order					13												13

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DETAILS AS TO LIGHTS ON LIGHT VESSELS.

	1st dist.	2d dist.	3d dist.	5th dist.	6th dist.	8th dist.	10th dist.	11th dist.	12th dist.	17th dist.	18th dist.	Total.
Characteristics as to lights:												
1 fixed white light		1	1		1		1	5	5	2	1	17
2 fixed white lights		3	4	2	3	2						14
1 fixed red light		2		1					1			4
2 fixed red lights		3		1								4
1 fixed white and 1 fixed red light		1		2						1		4
1 white flashing and 1 fixed red light			2									2
1 white light, flashing or occulting	1	1	2	1								5
2 white occulting lights			1	1							1	3
Illuminants:												
Incandescent oil vapor					1							1
Acetylene	1		2									3
Oil gas with mantle			1									1
Oil (wick)		10	6	6	3	2	1	5	6	3	1	43
Electric arc			1									1
Electric incandescent		1	2	2							1	6
Illuminating apparatus:												
Fourth order					1							1
Reflector		5	5	4	2	1		1		1		19
Reflector and lens lantern		1										1
Lens lantern	1	5	10	4	1	1	1	4	6	2	2	37

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DETAILS AS TO FOG SIGNALS.

Kind and how operated.	1st dist.	2d dist.	3d dist.	4th dist.	5th dist.	6th dist.	7th dist.	8th dist.	10th dist.	11th dist.	12th dist.	16th dist.	17th dist.	18th dist.	Total.
Steam:															
Whistle	9	9	6	.....	5	3	.....	2	6	34	32	.....	5	9	121
Siren	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	4
Air:															
Whistle	.....	2	.....	.....	1	1	.....	.....	.....	.....	7	1	.....	1	13
Siren	2	2	21	1	4	.....	.....	.....	4	5	8	4	6	17	74
Sireno (electric)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Reed horn	9	5	9	3	4	.....	.....	1	.....	.....	.....	4	11	.....	46
Submarine bells:															
On light vessels, driven by compressed air	1	7	7	.....	7	3	.....	2	1	3	4	.....	3	2	40
On bottom, electric power	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	1	.....	.....	.....	3
On buoys, operated by sea	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	3
Bell:															
Clockwork	36	13	59	8	69	2	.....	13	4	6	8	1	4	8	231
Electric	.....	2	1	.....	.....	.....	.....	.....	.....	3	.....	.....	1	.....	7
Engine	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Hand	12	.....	3	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	16
Horn: Hand	.....	2	.....	.....	.....	.....	1	.....	.....	1	1	.....	.....	.....	5
Total	69	45	108	12	91	9	1	18	15	55	61	10	32	40	* 566

* Auxiliary fog signals are not included (75 signals).

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LIGHTED AIDS, EXCLUSIVE OF LIGHTED BUOYS, IN COMMISSION ON JUNE 30, 1913, USING ILLUMINANTS OTHER THAN LIQUID OIL.

INCANDESCENT OIL-VAPOR LIGHTS (229 LIGHTS).

District.	Location.
1st.....	Avery Rock, Me.
	Baker Island, Me.
	Cape Neddick, Me.
	Dice Head, Me.
	Egg Rock, Me.
	Great Duck Island, Me.
	Halfway Rock, Me.
	Isles of Shoals, N. H.
	Libby Islands, Me.
	Matinicus Rock, Me.
	Monhegan Island, Me.
	Moose Peak, Me.
	Owlshead, Me.
	Petit Manan, Me.
	Portsmouth Harbor (Newcastle), N. H.
	Rockland Breakwater, Me.
	Seguin, Me.
	The Cuckolds, Me.
	Two-Bush Island, Me.
	West Quoddy Head, Me.
	Whaleback, Me.
	Whitehead, Me.
	Wood Island, Me.
2d.....	Cape Ann North, Mass.
	Cape Ann South, Mass.
	Cape Cod, Mass.
	Cape Poge, Mass.
	Chatham North, Mass.
	Chatham South, Mass.
	Cuttyhunk, Mass.
	Dumpling Rock, Mass.
	Gay Head, Mass.
	Minots Ledge, Mass.
	Monomoy Point, Mass.
	Nantucket (Great Point), Mass.
	Nauset Beach, Mass.
	Nobska Point, Mass.
	Plymouth (Gurnet), Mass.
	Plymouth (Gurnet) Beacon, Mass.
	Race Point, Mass.
	Sankaty Head, Mass.
	The Graves, Mass.
	West Chop, Mass.
3d.....	Absecon, N. J.
	Barnegat, N. J.
	Beavertail, R. I.
	Block Island North, R. I.
	Block Island Southeast, R. I.
	Chapel Hill, N. J.
	Conover Beacon, N. J.
	Eatons Neck, N. Y.
	Elm Tree Beacon, N. Y.
	Execution Rocks, N. Y.
	Falkner Island, Conn.
	Fire Island, N. Y.
	Great Captain Island, Conn.
	Hereford Inlet, N. J.
	Horton Point, N. Y.
	Little Gull Island, N. Y.
	Ludlam Beach, N. J.
	Montauk Point, N. Y.
	New Dorp, N. Y.
	New London Ledge, Conn.
	North Hook Beacon, N. J.
	Old Field Point, N. Y.
	Pecks Ledge, Conn.
	Plum Island, N. Y.
	Point Comfort, N. J.
	Point Judith, R. I.
	Race Rock, N. Y.
	Romer Shoal, N. Y.
	Sandy Hook, N. J.
	Sea Girt, N. J.
	Shinnecock Bay, N. Y.
	Staten Island, N. Y.
	Stratford Shoal (Middle Ground), N. Y.
	Tucker Beach, N. J.
	West Bank, N. Y.
	Watch Hill, R. I.
4th.....	Bellevue Range Rear, Del.
	Cape Henlopen, Del.
	Cape May, N. J.
	Delaware Breakwater Range Front, Del.
	Elbow of Cross Ledge, N. J.
	Fenwick Island, Del.
	Fourteen-Foot Bank, Del.
	Harbor of Refuge, Del.
	Listons Range Front, Del.
	Listons Range Rear, Del.
	Miah Maull Shoal, N. J.
	Reedy Island Range Front, Del.
	Reedy Island Range Rear, Del.
	Schooner Ledge Range Rear, Pa.
	Ship John Shoal, N. J.
5th.....	Assateague, Va.
	Bodie Island, N. C.
	Cape Charles, Va.
	Cape Hatteras, N. C.
	Cape Henry, Va.
	Cape Lookout, N. C.
	Currituck Beach, N. C.
	Hog Island, Va.
	Hooper Island, Md.
	Ocracoke, N. C.
	Point No Point, Md.
	Sandy Point, Md.
	Sharps Island, Md.
	Smith Point, Va.
	Thomas Point Shoal, Md.
	York Spit, Va.
6th.....	Cape Canaveral, Fla.
	Cape Fear, N. C.
	Cape Romain, S. C.
	Charleston, S. C.
	Frying Pan Shoals Light Vessel No. 94, N. C.
	Hillsboro Inlet, Fla.
	Hunting Island, S. C.
	Jupiter Inlet, Fla.
	Mosquito Inlet, Fla.
	St. Augustine, Fla.
	St. Johns River, Fla.
	St. Simon, Ga.
	Tybee, Ga.
7th.....	Alligator Reef, Fla.
	American Shoal, Fla.
	Anclote Keys, Fla.
	Carysfort Reef, Fla.
	Dry Tortugas, Fla.
	Egmont Key, Fla.
	Fowey Rocks, Fla.
	Key West, Fla.
	Sand Key, Fla.
	Sanibel Island, Fla.
	Sombrero Key, Fla.
8th.....	Bolivar Point, Tex.
	Cape St. George, Fla.
	Cape San Blas, Fla.
	Matagorda, Tex.
	Sabine Bank, Tex.
	Sabine Pass, La.
	Sand Island Range Front, Ala.
	South Pass Range Rear, La.
	Southwest Pass Range Rear, La.
9th.....	Mona Island, P. R.
	Point Borinquen, P. R.
10th.....	Cleveland West Breakwater Pierhead, Ohio.
	Dunkirk, N. Y.
	Fairport, Ohio.
11th.....	Detour, Mich.
	Eagle Harbor, Mich.
	Fort Gratiot, Mich.
	Huron Island, Mich.
	Isle aux Peches Range Front, Mich.
	Manitou, Mich.
	Marquette, Mich.
	Outer Island, Mich.

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Lighted aids, exclusive of lighted buoys, in commission on June 30, 1913, using illuminants other than liquid oil—Continued.

INCANDESCENT OIL-VAPOR LIGHTS—Continued.

District.	Location.	District.	Location.
11th.....	Point Iroquois, Mich.	17th.....	Tillamook Rock, Oreg.
	Portage Lake Ship Canals, Mich.		Umpqua River, Oreg.
	Presque Isle, Mich.		West Point, Wash.
	Rock of Ages, Mich.		Yaquina Head, Oreg.
	Spectacle Reef, Mich.	18th.....	Ano Nuevo Island, Cal.
	Split Rock, Minn.		Bonita Point, Cal.
	Superior Entry South Breakwater, Wis.		Cape Mendocino, Cal.
	Thunder Bay Island, Mich.		Carquinez Strait, Cal.
	Two Harbors, Minn.		East Brother Island, Cal.
12th.....	Big Sable, Mich.		Farallon Island, Cal.
	Calumet Harbor, Ill.		Fort Point, Cal.
	Cana Island, Wis.		Goat Island, Cal.
	Chicago Harbor, Ill.		Humboldt, Cal.
	Grand Traverse, Mich.		Mile Rocks, Cal.
	Grossepoint, Ill.		Piedras Blancas, Cal.
	South Manitou, Mich.		Pigeon Point, Cal.
	Sturgeon Bay Canal, Wis.		Point Arena, Cal.
	Tail Point, Wis.		Point Arguello, Cal.
	Twin River Point, Wis.		Point Cabrillo, Cal.
	White Shoal, Mich.		Point Conception, Cal.
16th.....	Cape Hinchinbrook, Alaska.		Point Fermin, Cal.
17th.....	Alki Point, Wash.		Point Hueneme, Cal.
	Burrows Island, Wash.		Point Loma, Cal.
	Cape Arago, Oreg.		Point Montara, Cal.
	Cape Blanco, Oreg.		Point Pinos, Cal.
	Cape Disappointment, Wash.		Point Reyes, Cal.
	Cape Flattery, Wash.		Point Sur, Cal.
	Cape Meares, Wash.		Punta Gorda, Cal.
	Desdemona Sands, Oreg.		Roe Island, Cal.
	Destruction Island, Wash.		St. George Reef, Cal.
	Grays Harbor, Wash.		San Luis Obispo, Cal.
	Heceta Head, Oreg.		San Pedro Breakwater, Cal.
	New Dungeness, Wash.		Santa Barbara, Cal.
	North Head, Wash.	19th.....	Barbers Point, Hawaii.
	Patos Island, Wash.		Diamond Head, Hawaii.
	Point Wilson, Wash.		Kilauea Point, Hawaii.
	Semiamoo Harbor, Wash.		Makapuu Point, Hawaii.
	Smith Island, Wash.		

ACETYLENE LIGHTS (246 LIGHTS).

1st.....	House Island, Me.....	3d.....	Sands Point, 4, N. J.
	Steele Ledge Monument, Me.		Sea Haven, N. J.
2d.....	Billingsgate Island, Mass.		South Hook Beacon, N. J.
3d.....	Block Island Breakwater, R. I.		U. S. Dike, 1, N. J.
	Block Island Breakwater Inner Basin, R. I.		U. S. Dike, 3, N. J.
		4th.....	Bellevue Range Front, Del.
	Block Island Breakwater Outer Basin, R. I.		Billingsport Range Front, N. J.
			Cherry Island Range Front, Del.
	Branford Reef, Conn.		Christiana South Jetty, Del.
	Cold Spring Inlet, N. J.		Cohansey, N. J.
	Cooks Sedges, 13, N. J.		Eagle Point Range, N. J. (2 lights).
	Cornfield Point Light Vessel No. 48, Conn.		East Point, N. J.
			Egg Island, N. J.
	Fuller Rock, R. I.		Finns Point Jetty, N. J.
	Glencove Breakwater, N. Y.		Grubbs Landing, Del.
	Goose Neck Point, 11, N. J.		Horseshoe Range West Group Lower Front, Pa.
	Great Salt Pond Breakwater, Outer End, R. I.		
			Maurice River Range, N. J. (2 lights).
	Jones Rocks, Conn.		Mispillion River, Del.
	Little Silver, 9, N. J.		Salem Creek, N. J.
	Low Moor, 7, N. J.		Schuylkill River Range, Pa. (2 lights).
	Lower Rocky Point, 2, N. J.		Smyrna Range, Del. (2 lights).
	Negro Point, N. Y.	5th.....	Alligator River, N. C.
	New London Harbor, Conn.		Reeds Hammock, N. C.
	Northeast End Light Vessel No. 44, N. J.	6th.....	Bloody Point Range, Ga. (2 lights).
			Cape Fear River, N. C. (10 lights).
	Northwest Point, 2A, N. J.		Jones Island Range, Ga. (2 lights).
	Point Judith Harbor of Refuge Main Breakwater East, R. I.		Tybee Range Front, Ga.
			Winyah Bay South Jetty, S. C.
	Point Judith Harbor of Refuge Main Breakwater Center, R. I.	7th.....	Charlotte Harbor, Fla.
			Tortugas Harbor, Fla.
	Point Judith Harbor of Refuge Main Breakwater West, R. I.	8th.....	Caucus Cut and Pensacola Bay Rear, Fla.
			Cutoff Channel, Ala. (2 lights).
	Point Judith Harbor of Refuge East Breakwater, R I		Cutoff Channel Range, Ala. (2 lights).

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Lighted aids, exclusive of lighted buoys, in commission on June 30, 1913, using illuminants other than liquid oil—Continued.

ACETYLENE LIGHTS—Continued.

District.	Location.
8th.....	East Bank, Tex.
	Galveston Bay Channel, Nos. 1, 3, and 4, Tex. (3 lights).
	Galveston Dike, West End, Tex.
	Galveston Jetty, Tex.
	Galveston North Jetty, Tex.
	Hitchcock Reef, Tex.
	Mobile Ship Channel, Ala. (19 lights).
	Port Arthur Canal, Tex.
	Port Bolivar Range, Tex. (2 lights).
	Sabine Pass Channel, La.
	Sabine Pass Entrance and Inner Ranges, La. (4 lights).
	Sand Island Range Rear (twin), Ala. (2 lights).
	Second Turn, Tex.
	Southwest Pass, East Jetty, La.
	Texas City Channel, Tex. (5 lights).
10th.....	Buffalo Breakwater, North End, N. Y. (temporary).
	Chaumont Harbor, N. Y.
	Cherry Island, N. Y.
	Cleveland East Breakwater Pierhead, Ohio.
	Cleveland East Breakwater West End, Ohio.
	Cleveland East Pier, Ohio.
	Cleveland West Breakwater East End, Ohio.
	Cleveland West Pier, Ohio.
	Fairport West Breakwater Pierhead, Ohio.
	Fairport West Pier, Ohio.
	Lorain East Breakwater Pierhead, Ohio.
	Lorain West Breakwater Pierhead, Ohio.
	Niagara River Range, N. Y. (2 lights).
	South Buffalo Pierhead, N. Y.
	Strawberry Island Lower Cut Range, N. Y. (2 lights).
	Strawberry Island Upper Cut Range, N. Y. (2 lights).
	Wells Island, N. Y.
11th.....	Au Sable Pierhead, Mich.
	Gull Rock, Mich.
	Harbor Beach Harbor of Refuge East Entrance South, Mich.
	Isle aux Peches Range Rear, Mich.
	Livingstone Channel, Nos. 2, 4, 6, 7, 8, and 10, Mich. (6 lights).
	Portage River Pierhead, Mich.
	Sturgeon Point, Mich.
	Superior Entry Inner North Breakwater, Wis.
	Superior Entry North Breakwater, Wis.
12th.....	Bank Point, Mich.
	Elbow, Wis.
	Frankfort South Pierhead, Mich.
	Grand Haven North Pierhead, Mich.
	Holland Range Front, Mich.
	Indiana Harbor Range, Ind. (2 lights).
	Kenosha Breakwater, Wis.
	Ludington North Breakwater, Mich.
	Ludington South Breakwater, Mich.
	Manitowoc South Breakwater, Wis.
	Michigan City Breakwater, Mich.
	Milwaukee Breakwater, Wis.
	Milwaukee South Pierhead, Wis.
	Petoskey, Mich.
	Racine Pierhead, Wis.
	Saugatuck South Pierhead, Mich.
	Sheboygan Breakwater, Wis.
	Waukegan Breakwater, Wis.
16th.....	Battery Point, Alaska.
	Beauclerc Island, Alaska.
	Blank Island, Alaska.
	Busby Island, Alaska.
	Bushy Island, Alaska.
	Cape Chacon, Alaska.
	Cape Fanshaw, Alaska.
	Cape Stephens, Alaska.
	Cape Strait, Alaska.
	Channel Island, Tongass Narrows, Alaska.
	Channel Island, Orca Bay, Alaska.
	Dewey Rocks, Alaska.
	East Clump, Alaska.
	Eye-Opener, Alaska.
	Fairway Island, Alaska.
	Grave Point, Alaska.
	Guard Islands, Alaska.
	Hog Rocks, Alaska.
	Key Reef, Alaska.
	Lincoln Rock, Alaska.
	Lone Tree Point, Alaska.
	Lord Rocks, Alaska.
	Mellen Rock, Alaska.
	Middle Rock, Alaska.
	Midway Islands, Alaska.
	Midway Rock, Alaska.
	Mitkof Island, Alaska.
	Ocean Cape, Alaska.
	Petersburg Float, Alaska.
	Point Arden, Alaska.
	Point Gardner, Alaska.
	Point Helen, Alaska.
	Point Hugh, Alaska.
	Point Retreat, Alaska.
	Point Sherman, Alaska.
	Point Young, Alaska.
	Rocky Island, Alaska.
	Seal Island, Alaska.
	Shakan Bay, Alaska.
	Shelter Island, Alaska.
	Ship Island, Alaska.
	Spanish Island, Alaska.
	Spire Island Reef, Alaska.
	Strait Island, Alaska.
	Stikine Strait, Alaska.
	Sukoi Islets, Alaska.
	Tenakee Inlet, Alaska.
	Turnabout Island, Alaska.
	Vank Island, Alaska.
	Vichnefski Rock, Alaska.
	Warburton Island, Alaska.
	Whale Island, Alaska.
	Zaikof Point, Alaska.
17th.....	Columbia River Entrance Range, Oreg. Wash. (2 lights).
	Neah Bay, Wash.
	Peapod Rocks, Wash.
	Viti Rocks, Wash.
18th.....	Anacapa Island, Cal.
	Ballast Point, Cal.
	La Playa, Cal.
	Richardson Rock, Cal.
19th.....	Hanapepe, Hawaii.
	Hawea Point, Hawaii.
	Kahala Point, Hawaii.
	Kahului Breakwater, Hawaii.
	Kaunakakai Range, Hawaii (2 lights).
	Kukuihaele, Hawaii.
	Laau Point, Hawaii.
	Lae o Kokole, Hawaii.
	Molokini, Hawaii.
	Pauwalu Point, Hawaii.

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Lighted aids, exclusive of lighted buoys, in commission on June 30, 1913, using illuminants other than liquid oil—Continued.

ELECTRIC ARC LIGHTS (10 LIGHTS).

District.	Location.	District.	Location.
1st.....	Kennebunkport Pier, Me. (no lens).	17th.....	Astoria Range, Oreg. (2 lights; no lens).
2d.....	South Boston Range, Mass. (with reflectors; 2 lights).	18th.....	Alcatraz Island, Cal.
	Wamsutta Mills, Mass. (no lens).	19th.....	Waiakea, Hawaii (no lens).
3d.....	Ambrose Channel Light Vessel No. 87, N. Y.		
	Navesink, N. J.		

ELECTRIC INCANDESCENT LIGHTS (21 LIGHTS).

2d.....	Nantucket Shoals Light Vessel No. 85, Mass.	17th.....	Coquille River Entrance Range, Oreg. (2 lights; no lens).
3d.....	Blackwells Island Reef, N. Y.		Coquille Upper Channel Range, Oreg. (2 lights; no lens).
	Fire Island Light Vessel No. 68, N. Y.		Smith Point Light, Oreg. (no lens).
	Goat Island Shoal, R. I.		Tacoma Waterway, Wash.
	Overfalls Light Vessel No. 69, Del.	18th.....	Mare Island Dike Lights, Nos. 4, 8, and 14, Cal. (3 lights; no lens).
5th.....	Bush Bluff Light Vessel No. 97, Va. (with reflector).		San Francisco Light Vessel No. 70, Cal.
	Diamond Shoal Light Vessel No. 71, N. C.	19th.....	Cocoanut Point, Hawaii.
11th.....	Duluth North Pier, Minn.		
	Marquette Breakwater, Mich.		
	Ontonagon Pierhead, Mich.		

GAS LIGHTS (25 LIGHTS).

2d.....	Newburyport Upper Harbor Range, Mass. (2 lights; coal gas).	11th	Grand Marais West Breakwater, Minn. (oil gas).
3d.....	Scotland Light Vessel No. 11, N. J. (oil gas).		Grosse Isle South Channel Range, Mich. (2 lights; oil gas).
5th.....	Currituck Sound, N. C. (4 lights; oil gas).		Portage Lake Ship Canals, East Breakwater, Mich. (oil gas).
	North Landing River, N. C. (5 lights; oil gas).		Portage Lake Ship Canals, West Breakwater, Mich. (oil gas).
	North River, N. C. (4 lights; oil gas).		St. Clair Flats Canal East Pierhead, Mich. (oil gas).
6th.....	Main Channel Range Rear (St. Philips Church), S. C. (coal gas).		Two Harbors Breakwater, Minn. (oil gas).
11th.....	Ecorse Range Rear, Mich. (oil gas).		

LIGHTS ESTABLISHED DURING THE FISCAL YEAR 1913.

[413 lights.]

District.	Location.	Order.
2d.....	Westport, Mass	Minor.
3d.....	Block Island Breakwater, R. I	Lens lantern.
	Block Island Breakwater Inner Basin, R. I	Do.
	Block Island Breakwater Outer Basin, R. I	Do.
	Canarsie Channel, N. Y	Minor.
	Centerville, N. J	Do.
	Duck Island North Breakwater, Conn	Minor.
	Fort Adams, R. I	Lens lantern.
	Goat Island, R. I	Do.
	Hartford Jetty, Conn	Minor.
	Negro Point, N. Y	Lens lantern.
	Pine Island Range Front, Conn	Minor.
	Point Judith Harbor East Breakwater, R. I	Lens lantern.
	Point Judith Harbor Main Breakwater, East, R. I	Do.
	Point Judith Harbor Main Breakwater, Center, R. I	Do.
	Point Judith Harbor Main Breakwater, West, R. I	Do.
	Ship Canal Lower, Conn	Minor.
	Ship Canal Upper, Conn	Do.
	Sloop Bar Hassock, N. Y	Do.
4th.....	Appoquinimink River Range, Del. (2 lights)	Do.
	Miah Maull Shoal, N. J	Fourth.
	Rehoboth Canal Jetty, Del	Minor.

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Lights established during the fiscal year 1913—Continued.

District.	Location.	Order.
5th.....	Bells Point, N. C.	Minor.
	Bentleys Point, Md.	Do.
	Bretts Bay, N. C.	Do.
	Bretts Point, N. C.	Do.
	Brices Creek, No. 2, N. C.	Do.
	Broome Island, Md.	Do.
	Buzzard Point, Md.	Do.
	Cedar Creek, N. C.	Do.
	Cedar Point Bar, Md.	Do.
	Cherrystone Channel, Va.	Do.
	Cockrells Point, Va.	Do.
	Collington Island, N. C.	Do.
	Core Creek Range, N. C. (2 lights)	Do.
	Core Creek Upper, N. C.	Do.
	Crab Point, N. C.	Do.
	Cradle Point, Va.	Do.
	Davis Island, N. C.	Do.
	Davis Shore, N. C.	Do.
	Dolbys Point, N. C.	Do.
	Dumpling Creek, N. C.	Do.
	East Drum Shoal, N. C.	Do.
	Foys Island, No. 5, N. C.	Do.
	Goose Creek, No. 4, N. C.	Do.
	Grassy Point, N. C.	Do.
	Great Island, N. C.	Do.
	Great Machipongo River, Nos. 1, 2, 3, 4, Va. (4 lights)	Do.
	Harkers Island, N. C.	Do.
	Haynies Point, Va.	Do.
	Haywoods Creek, No. 6, N. C.	Do.
	Honga River, Md.	Do.
	Isaacs Creek, N. C.	Do.
	Jarretts Bay, N. C.	Do.
	Judith Island, N. C.	Do.
	Judith Marsh, N. C.	Do.
	Kings Point, N. C.	Do.
	Lewis Creek, N. C.	Do.
	Lone Point, Va.	Do.
	Lovers Point, Md.	Do.
	Lynch Point, Va.	Do.
	Marshallberg, N. C.	Do.
	Mattox Creek, Va.	Do.
	Middle Ground, Va.	Do.
	Middle Marshes, N. C.	Do.
	Mill Creek, Va.	Do.
	Mill Point, N. C.	Do.
	Nags Head, N. C.	Do.
	Nelson Bay, N. C.	Do.
	Newport Marshes Lower, N. C.	Do.
	Newport Marshes Upper, N. C.	Do.
	North Entrance Canal, N. C.	Do.
	North River, N. C.	Do.
	Northend Point Shoal, Va.	Do.
	Occoquan Bay, No. 1, Va.	Do.
	Onancock Creek, Va.	Do.
	Piney Point, N. C.	Do.
	Point Patience, Md.	Do.
	Porpoise Point, Md.	Do.
	Powells Point, N. C.	Do.
	Priests Point, Md.	Do.
	Reeds Hammock, N. C.	Lens lantern (acetylene).
	Russells Creek, N. C.	Minor.
	Rock Spring, No. 1, N. C.	Do.
	Sandy Point, Va.	Do.
	Sandy Point, No. 2, Va.	Do.
	Shepherd Shoal, N. C.	Do.
	Steep Point, N. C.	Do.
	Straits Entrance, N. C.	Do.
	Swan Quarter Canal, N. C.	Do.
	Tar River, Nos. 1, 2, 3, N. C. (3 lights)	Do.
	Target Wreck, Md.	Do.
	Taylors Point, No. 3, Va.	Do.
	The Deeps, Va.	Do.
	Travis Point, Va.	Do.
	Trent River, No. 3, N. C.	Do.
	Upper Island Point, N. C.	Do.
	Upper Mud Bar, Nos. 4, 6, Va. (2 lights)	Do.
	West Drum Shoal, N. C.	Do.
	Westmouth Bay, N. C.	Do.
	White Point, N. C.	Do.
6th.....	Crossover Range, Fla. (2 lights)	Lens lantern.
	Lower Liliput Channel Range, N. C. (2 lights)	Lens lantern (acetylene).
	Lower Midnight Channel Range, N. C. (2 lights)	Do.
	Lower Swash Channel Range, N. C. (2 lights)	Do.

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Lights established during the fiscal year 1913—Continued.

District.	Location.	Order.
6th.....	North River, No. 20, Fla	Minor.
	St. Marys River, No. 2, Ga	Do.
	Sisters Creek, Fla	Do.
	Snow Marsh Channel Range, N. C. (2 lights)	Lens lantern (acetylene).
	Upper Liliput Channel Range Front, N. C	Do.
	Upper Midnight Channel Range Front, N. C	Do.
	Wards Bank Range, Fla. (2 lights)	Reflector.
7th.....	Cut D Range Front, Fla	Minor.
	Cut D and F Range Rear, Fla	Do.
	Cut F Range Front, Fla	Do.
	Cut G Range, Fla. (2 lights)	Do.
	Hillsboro River Entrance Range, Fla. (2 lights)	Do.
8th.....	Bayou Rigolettes Entrance Nos. 1, 3, La. (2 lights)	Do.
	Courtney Point Shoal, Fla	Lens lantern.
	Crooked River Range Rear, Fla	Do.
	Cutoff Channel Nos. 2, 4, Ala. (2 lights)	Lens lantern (acetylene).
	Cutoff Channel Range, Ala. (2 lights)	Do.
	Depot Point, La	Minor.
	Double Bayou, La	Do.
	Dyers Point Shoal, Fla	Lens lantern.
	Galveston Bay Channel, No. 4, Tex	Lens lantern (acetylene).
	Grand Bayou, La	Minor.
	Harveys Cutoff Entrance Nos. 2, 4, La. (2 lights)	Do.
	Little Lake South, La	Do.
	Little Oyster Bar, Fla	Lens lantern.
	Oysterville, La	Minor.
	Port Shoal, Fla	Lens lantern.
	Red Fish Point, Fla	Do.
	St. George Sound Turn, Fla	Do.
	Scotts Canal, La	Minor.
	Sulphur Point Shoal, Fla	Lens lantern.
10th.....	Ashtabula Inner Breakwater, Ohio	Minor.
11th.....	Brush Point Range Front, Mich. (temporary)	Do.
	Cross Channel, Minn	Do.
	Keweenaw Harbor of Refuge, Mich. (3 lights)	Fifth (1); lens lantern (2).
	Livingstone Channel, Nos. 2, 4, 6, 7, 8, 10, Mich. (6 lights)	Lens lantern (acetylene).
	Portage Entry Revetment North and South, Mich. (2 lights; temporary).	Minor.
	Rice Point, No. 6, Minn	Do.
	St. Clair Flats Canal East Pierhead, Mich	Lens lantern.
	Superior Entry Inner North Pierhead, Wis	Lens lantern (acetylene).
	Superior Entry North Breakwater, Wis	Fifth.
	Superior Entry North Inner Pier, Wis. (temporary)	Minor.
	Superior Entry South Breakwater, Wis	Fourth.
12th.....	Manitowoc South Breakwater, Wis	Lens lantern (acetylene).
	Milwaukee South Pierhead, Wis	Do.
13th.....	34 minor lights	
	8 lighted spar buoys	
14th.....	14 minor lights	
15th.....	131 minor lights	
16th.....	Blank Island, Alaska	Do.
	Busby Island, Alaska	Do.
	Cape Fanshaw, Alaska	Do.
	Danger Point Float, No. 8, Alaska	Minor.
	Gedney Island, Alaska	Do.
	Grave Point, Alaska	Lens lantern (acetylene).
	Key Reef, Alaska	Do.
	Lone Tree Point, Alaska	Do.
	Lord Rocks, Alaska	Do.
	Petersburg Float, No. 24, Alaska	Do.
	Point Helen, Alaska	Do.
	Point Hugh, Alaska	Do.
	Point Lockwood Rock Float, Alaska	Minor.
	Seal Island, Alaska	Lens lantern (acetylene).
	Shakan Bay, Alaska	Do.
	Spanish Island, Alaska	Do.
	Spike Rock Float, No. 3, Alaska	Minor.
	Sukoi Islets, Alaska	Lens lantern (acetylene).
	Vichnefski Rock, Alaska	Do.
	Warburton Island, Alaska	Do.
17th.....	Bay City Cut, Oreg	Minor.
	Beacon 4, Oreg	Do.
	Cowlitz River, Wash	Do.
	Dick Point, Oreg	Do.
	Dry Stocking Bar, Oreg	Do.
	Fishers Dock, Wash	Do.
	Garibaldi, Oreg	Do.
	Grays Harbor Range, Wash. (2 lights)	Lens lantern.
	Grays Point, Wash	Minor.
	Hobsonville, Oreg	Do.
	Ilwaco Channel, Oreg	Lens lantern.
	Knappton, Wash	Minor.
	Lower Dike, Oreg	Do.

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Lights established during the fiscal year 1913—Continued.

District.	Location.	Order.
17th.....	Main Channel, Oreg.....	Minor.
	Middle Channel Dike, Oreg.....	Do.
	North Jetty, Oreg.....	Do.
	Pancake Point, Oreg.....	Do.
	Puget Island, Oreg.....	Do.
	Rocky Point, Wash.....	Do.
	Ryans Point, Wash.....	Do.
	Skagit River Jetty, Wash.....	Do.
	Slaughter River Range Rear, Wash.....	Do.
	Yaquina Jetty, Oreg.....	Do.
	Tacoma Waterway, Wash.....	Electric incandescent.
18th.....	Petaluma Creek, No. 4, Cal.....	Lens lantern.
	San Pedro Breakwater, Cal.....	Fourth.
19th.....	Kilauea Point, Hawaii.....	Second.

LIGHTS WHERE ILLUMINATION WAS IMPROVED DURING THE FISCAL YEAR 1913.

FLASHING OR OCCULTING LIGHTS CHANGED FROM FIXED LIGHTS (26 LIGHTS).

District.	Location.	District.	Location.
1st.....	Whaleback, Me.	12th.....	Kenosha Breakwater, Wis.
2d.....	Billingsgate Island, Mass.		Petoskey, Mich.
3d.....	Fuller Rock, R. I.		Sheboygan Breakwater, Wis.
5th.....	Bush Bluff Light Vessel, Va.		Waukegan Breakwater, Ill.
6th.....	Bloody Point Range, Ga. (2 lights).	16th.....	Channel Island, Orca Bay, Alaska.
	Jones Island Range, Ga. (2 lights).		Guard Island, Alaska.
7th.....	Charlotte Harbor, Fla.		Lincoln Rock, Alaska.
	Tortugas Harbor, Fla.		Midway Rock, Alaska.
11th.....	Au Sable Pierhead, Mich.		Mitkof Island, Alaska.
	Gull Rock, Mich.	17th.....	Alki Point, Wash.
	Harbor Beach Harbor of Refuge East Entrance South, Mich.	18th.....	Santa Cruz, Cal.
		19th.....	Barbers Point, Hawaii.
	Sturgeon Point, Mich.		

INCANDESCENT OIL-VAPOR LIGHTS CHANGED FROM OIL-WICK LIGHTS (73 LIGHTS).

1st.....	Baker Island, Me.	5th.....	Sharps Island, Md.
	Cape Neddick, Me.		Smith Point, Va.
	Egg Rock, Me.		Thomas Point, Md.
	Great Duck Island, Me.		York Spit, Va.
	Halfway Rock, Me.	6th.....	St. Johns River, Fla.
	Isles of Shoals, N. H.		St. Simon, Ga.
	Matinicus Rock, Me.	7th.....	Alligator Reef, Fla.
	Monhegan Island, Me.		American Shoal, Fla.
	Moose Peak, Me.		Carysfort Reef, Fla.
	Petit Manan, Me.		Fowey Rocks, Fla.
	Rockland Breakwater, Me.		Sand Key, Fla.
	Seguin, Me.		Sombrero Key, Fla.
	The Cuckolds, Me.	8th.....	Cape St. George, Fla.
	Two-Bush Island, Me.		Matagorda, Tex.
	Whaleback, Me.		Sabine Bank, Tex.
	Whitehead, Me.		Sabine Pass, La.
	Wood Island, Me.		Sand Island Range Front, Ala.
2d.....	Gay Head, Mass.		Southwest Pass Range Rear, La.
	Nantucket (Great Point), Mass.	9th.....	Mona Island, P. R.
	Sankaty Head, Mass.		Point Borinquen, P. R.
3d.....	Beavertail, R. I.	10th.....	Dunkirk, N. Y.
	Execution Rocks, N. Y.		Fairport, Ohio.
	Stratford Shoal (Middle Ground), N. Y.	11th.....	Eagle Harbor, Mich.
4th.....	Fenwick Island, Del.		Fort Gratiot, Mich.
	Listons Range Rear, Del.		Huron Island, Mich.
	Ship John Shoal, N. J.		Manitou, Mich.
5th.....	Assateague, Va.		Outer Island, Mich.
	Bodie Island, N. C.		Point Iroquois, Mich.
	Cape Charles, Va.		Portage Lake Ship Canals, Mich.
	Cape Hatteras, N. C.		Presque Island, Mich.
	Cape Henry, Va.		Spectacle Reef, Mich.
	Cape Lookout, N. C.		Thunder Bay Island, Mich.
	Currituck Beach, N. C.	17th.....	Alki Point, Wash.
	Hog Island, Va.	18th.....	Point Pinos, Cal.
	Hooper Island, Md.		San Luis Obispo, Cal.
	Point No Point, Md.	19th.....	Barbers Point, Hawaii.
	Sandy Point, Md.		

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Lights where illumination was improved during the fiscal year 1913—Continued.

ACETYLENE OR OTHER LIGHTS CHANGED FROM OIL-WICK LIGHTS, ETC. (32 LIGHTS).

District.	Location.	District.	Location.
2d	Billingsgate Island, Mass.	12th	Kenosha Breakwater, Wis.
3d	Fuller Rock, R. I.		Petoskey, Mich.
	New London Harbor, Conn. (changed from oil vapor).		Sheboygan Breakwater, Wis.
			Waukegan Breakwater, Ill.
4th	Billingsport Range Front, N. J.	16th	Channel Island, Orca Bay, Alaska.
	Schuylkill River Range, Pa. (2 lights).		Guard Islands, Alaska.
	Smyrna Range, Del. (2 lights).		Lincoln Rock, Alaska.
5th	Bush Bluff Light Vessel, No. 97, Va. (electric changed from oil wick).		Midway Rock, Alaska.
			Mitkof Island, Alaska.
6th	Bloody Point Range, Ga. (2 lights).	17th	Columbia River Entrance Range, Oreg. and Wash. (2 lights).
	Jones Island Range, S. C. (2 lights).		
7th	Charlotte Harbor, Fla.	18th	Alcatraz, Cal. (electric arc changed from incandescent oil vapor).
	Tortugas Harbor, Fla.		
11th	Au Sable Pierhead, Mich.		Ballast Point, Cal.
	Gull Rock, Mich.		
	Harbor Beach Harbor of Refuge East Entrance South, Mich.		
	Sturgeon Point, Mich.		

LIGHTS DISCONTINUED DURING THE FISCAL YEAR 1913.

[234 lights, including float lights.]

District.	Location.	Order.
3d	Block Island Breakwater Range, R. I. (2 lights)	Minor.
	Centerville, N. J	Do.
	Cheney Bar, N. Y	Do.
	Goat Island, R. I	Electric incandescent.
	Sassafras Point, R. I	Sixth.
4th	Bombay Hook, Del	Fourth.
5th	Tar River, No. 3, N. C	Minor.
6th	Bull Bay, S. C	Fourth.
	Clapboard Creek Range Rear, Fla	Minor.
	Horseshoe Shoal Range Front, No. 2 B, N. C	Do.
	Liliput Channel Range Front, No. 4, and Rear, N. C. (2 lights)	Do.
	Lower Swash Channel, No. 2, N. C	Do.
	Midnight Channel, No. 1, N. C	Do.
	Reeves Point Channel Range, N. C. (2 lights)	Do.
	St. Johns River Range Front, Fla	Reflector.
	Snow Marsh Channel Range, N. C. (2 lights)	Minor.
	White Shells Cut, No. 1, Fla	Do.
7th	Hillsboro Bay, Nos. 8, 9, 10, Fla. (3 lights)	Lens lantern.
8th	Battery Gladden, Ala	Lens lantern (acetylene).
	Bayou Teche, La	Minor.
	Choctaw Pass Channel Range Rear, La	Lens lantern (acetylene).
	Mobile Ship Channel, Nos. 16a, 3, 18, 20, 5, 22, Ala. (6 lights)	Do.
	Second Bend Upper, Ala	Minor.
	Six Foot Spot, Fla	Lens lantern.
11th	Comlins Point, Minn	Minor.
	Oak Point, Minn	Do.
	Portage Range, Mich. (2 lights)	Lens lantern (1); fifth (1).
	Rainy River Entrance, Minn	Minor.
	St. Marys Falls Canal, South Pier, Mich	Do.
	Superior Entry North, South, and Inner North Breakwaters, Wis. (3 lights).	Do.
	Superior Pierhead Range, Wis. (2 lights)	Reflector (1); lens lantern (1).
12th	Wangoshance, Mich	Fourth.
13th	35 post lights	Minor.
	5 lighted spar buoys	Do.
14th	3 post lights	Do.
15th	126 post lights	Do.
16th	Battery Islets Range Rear, Alaska	Do.
	Beluga River Range, Alaska (2 lights)	Do.
	Gull Island, Alaska	Do.
	Latouche Passage, Alaska	Do.
	Odiak Channel Range, Alaska (2 lights)	Do.
	Orca Inlet Range, Alaska (2 lights)	Do.
	Sitka Harbor, Alaska	Do.
	Spike Rock, Alaska	Do.
	Stockade Point, Alaska	Do.
17th	Dobelbower, Oreg	Do
	Skagit River, Wash	Do.
	Stevens Point, Oreg	Do.
	Waaddah Island, Wash	Do.
18th	Petaluma Creek, No. 4, Cal	Lens lantern.
	San Pedro Breakwater, Cal	Do.

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LIGHTS, EXCLUSIVE OF LIGHTED BUOYS, WHICH WILL PROBABLY BE ESTABLISHED DURING THE FISCAL YEAR 1914.

District.	Location.	Probable date of establishment.	Order.	Illuminant.	Additional keepers or laborers required.
1st	Clarks Ledge, Me	May, 1914	Lens lantern	Acetylene	
	Hendersons Point, Me	June, 1914	do	do	1
	Ram Island Ledge, Me	do	do	do	
	Stockton Harbor Range, Me		do	do	
2d	Gallups Island, Mass	May, 1914	do	Electric incandescent.	1
	Deacons Pond Jetty, Mass	do	Minor	Acetylene	
3d	Aunt Phebe, N. Y	July, 1913	Lens lantern	do	
	Great Kills, N. Y		do	do	
	Tuckerton, N. J		do	Oil	1
4th	Little River Range, Del. (2 lights)	Aug., 1913	Minor	do	1
5th	Battle Creek Shoal, Md		do	Acetylene	
	Blackwalnut Point Shoal, Md	Oct., 1913	do	do	
	Chadwick Point Shoal, N. C	July, 1913	do	do	
	Fishing Point Outer, Va	Sept., 1913	do	do	
	Fort McHenry, Md	Oct., 1913	Lens lantern	do	1
	Hack Neck Shoal, Va		Minor	do	
	Hills Creek, N. C	Oct., 1913	do	Oil	
	Jarvis Point Shoal, Va		do	Acetylene	
	Jordan Point Range Front, Va		Lens lantern	Oil	
	Manokin River, Md		Minor	Acetylene	
	Mikes Sand, Va		do	Oil	1
	Petersons Point, Md		do	Acetylene	
	Running Channel, Va		do	Oil	1
	St. Pierre Island, Md		do	Acetylene	
	Sand Shoal Inlet Range, Va. (2 lights)		Lens lantern	Oil	1
	The Spit, Va		Minor	do	1
	Turn of Sargeant, Va		do	do	1
6th	Big Island Channel Lower Range, N. C. (2 lights).	Nov., 1913	Lens lantern	do	
	Big Island Channel Upper Range Rear, N. C.	do	do	do	
	Cedar Hammock Range, Ga. (2 lights)	Dec., 1913	Reflectors	do	
	Clarks Island Range, N. C. (2 lights)	Nov., 1913	Lens lantern	do	
	Dawho River, S. C. (4 lights)	Jan., 1914	Minor	do	1
	Eagle Island, N. C	Nov., 1913	Lens lantern	do	
	Fourth Eastern Jetty Range, N. C. (2 lights).	do	do	do	
	Keg Island Channel Range, N. C. (2 lights).	do	do	do	
	Orton Cove Lower Range Rear, N. C	do	do	Acetylene	
	Orton Cove Upper Range Rear, N. C	do	do	do	
	Turtle River Range, Ga. (2 lights)	Dec., 1913	Reflector	Oil	
	Upper Brunswick Channel Range, N. C. (2 lights).	Nov., 1913	Minor	do	
7th	Anclote River Nos. 6, 7, 9, 11,14; Cuts A and B Range Front, Cut A Range Rear, and Cut B Range Rear, Fla. (8 lights).		do	do	1
	Cut D Range, Tampa Bay, Fla. (2 lights)	Jan., 1914	do	Acetylene	
	Cut J Range, Tampa Bay, Fla. (2 lights)	Aug., 1913	Lens lantern	do	
	Egmont Key Range Front, Fla		Minor	do	
	Hillsboro Bay No. 9, Fla	Sept., 1913	Lens lantern	Oil	
	Little Manatee River No. 1, Fla	Aug., 1913	Minor	do	
	Matanzas Pass, Fla		do	do	
	North Bank, Cedar Keys, Fla	Dec., 1913	Lens lantern	Acetylene	
8th	Bayou Boutte, La		Minor	Oil	
	Blackwater Bay Channel Range and East Bay Channel Range, Fla. (4 lights).	Sept., 1913	Lens lantern	do	
	Bunch Timber Range, Fla. (2 lights)	do	Minor	do	1
	Carrabelle River Entrance No. 2, Fla	Nov., 1913	Lens lantern	do	
	Circle Crossing Range, Fla. (2 lights)	Oct., 1913	Minor	do	1
	Franks Crossing, La	Nov., 1913	do	do	
	Galveston Bay Channel, No. 6, Tex	do	Lens lantern	Acetylene	
	Grand Lake East, La		Minor	Oil	1
	Hog Island, La		do	do	
	Lake Chicot South, La		do	do	
	Oliver Point, Tex	Dec., 1913	do	do	
	Picayune Bayou, La	Nov., 1913	do	Acetylene	
	Seabrook, Tex	do	do	do	
	Shields Point, Fla	July, 1913	do	Oil	
	Stouts Point, La		do	do	
	White Lake West, La		Lens lantern	do	1
	White Lake East, La		do	do	1
	Vermillion Bay West, La		do	do	1

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Lights, exclusive of lighted buoys, which will probably be established during the fiscal year 1914—Continued.

District.	Location.	Probable date of establishment.	Order.	Illuminant.	Additional keepers or laborers required.
10th.....	Ballast Island, Ohio	June, 1914	Lens lantern.	Acetylene	1
	Buffalo South Pier, N.Y	.....	....do.....	Electricity	.....
	Linda Island, N. Y	June, 1914	....do.....	Acetylene	.....
	Maumee Crib, Ohio (4 lights)	Oct., 1913	....do.....	Oil	.....
11th.....	Port Wing East Breakwater, Wis	Nov., 1913	....do.....	Acetylene	.....
	Recors Point, Mich	Aug., 1913	....do.....	Pintsch gas	.....
	Superior Entry Inner South Pierhead, Wis.	Oct., 1913	....do.....	Acetylene	.....
12th.....	Charlevoix North Pierhead, Mich	....do.....	....do.....	Electric incandescent.	.....
	Kewaunee North Pierhead, Wis	Sept., 1913	....do.....	Acetylene	.....
	Manistique Breakwaters and Pierhead, Mich.	.....	Minor	....do.....	3
	Oconto South Pierhead, Wis	.....	Lens lantern.	....do.....	.....
	Saunders Point, Mich	Oct., 1913	....do.....	....do.....	.....
16th.....	Barren Island, Alaska	Sept., 1913	Minor	....do.....	.....
	Caines Head, Alaska	Aug., 1913	Lens lantern.	....do.....	.....
	Cape St. Elias, Alaska	.....	Minor	....do.....	.....
	Cape Spencer, Alaska	Oct., 1913	Lens lantern.	....do.....	.....
	Eckholms, Alaska	May, 1914	Minor	....do.....	.....
	Fire Island, Alaska	July, 1913	....do.....	Oil	.....
	Hive Island, Alaska	.....	....do.....	Acetylene	.....
	Kake Harbor, Alaska	.....	....do.....	Oil	.....
	Murder Cove, Alaska	Sept., 1913	....do.....	....do.....	.....
	Pilot Rock, Alaska	Aug., 1913	Lens lantern.	....do.....	.....
	Point Ellis, Alaska	Sept., 1913	....do.....	....do.....	.....
	Point Elrington, Alaska	....do.....	....do.....	....do.....	.....
	Point Johnston, Alaska	June, 1914	Minor	....do.....	.....
	Rugged Island, Alaska	.....	....do.....	....do.....	.....
	Sitka Rock, Alaska	May, 1914	....do.....	....do.....	.....
	Smith Island, Alaska	Sept., 1913	Lens lantern.	....do.....	.....
	Susitna River Range Rear, Alaska	July, 1913	Minor	Oil	.....
	Woody Island, Alaska	Aug., 1913	....do.....	Acetylene	.....
17th.....	Dobelbower, Oreg	Sept., 1913	....do.....	Oil	1
	Glasgow Range Upper and Lower Rear, Oreg. (2 lights).	.....	....do.....	....do.....	.....
	Ben Ure Island, Wash	Nov., 1913	....do.....	....do.....	1
	Hope Island, Wash	....do.....	....do.....	....do.....	
	Hunters Bar, Oreg	Oct., 1913	....do.....	....do.....	
	Seal Rock, Wash	.....	....do.....	....do.....	
	Jarvis Lower Range Rear, Oreg	.....	....do.....	....do.....	.....
	Libby Coal Bunker, Oreg	.....	....do.....	....do.....	.....
	Walker Island Dike, Oreg	July, 1913	....do.....	....do.....	.....
	Whatcom Waterway, Wash	Oct., 1913	....do.....	....do.....	1
18th.....	Arcata Channel Nos. 5, 9, 12, Cal	Aug., 1913	....do.....	....do.....	1
	Arcata Wharf, Cal	....do.....	....do.....	....do.....	
	Redding Rock, Cal	Dec., 1913	Lens lantern.	Acetylene	.....
	Seal Island No. 3, Cal	Jan., 1914	Electric incandescent.	Electricity	.....
19th.....	Kipahulu, Hawaii	June, 1914	Lens lantern.	Acetylene	.....

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GAS BUOYS ESTABLISHED AND DISCONTINUED DURING THE FISCAL YEAR 1913.

District.	Location.
	ESTABLISHED (75).
2d.....	Bombay wreck, HS, Mass.
	Boston Main Channel, Nos. 1, 2, 6, 7, 8, Mass.
	Falcon wreck, HS, Mass.
	Nix Mate, 1, Mass.
	Pollock Rip, 7, Mass.
3d.....	Ambrose Channel, Nos. 11, 15, N. Y.
	Barge wreck, HS, N. Y.
	Block Island North Reef, 1BI (bell), R. I.
	Charles Island Rocks, 16A (bell), Conn.
	City of Georgetown wreck, HS, Del.
	Gangway Rocks, 2GR, N. Y. and R. I.
	Massachusetts wreck, HS, Conn.
	Napatree Point Ledge, 4NP (bell), N. Y. and R. I.
4th.....	Joe Flogger Shoal, 11B (bell), Del.
5th.....	Alum Chine wreck, HS, Md.
	Andrew Johnson wreck, HS, Md.
	Bangor wreck, A, HS, Va.
	Bangor wreck, B, HS, Va.
	Bangor wreck, HS, Va.
	Charmer wreck, HS, Va.
	C. W. Seward wreck, HS, Md.
	Florida wreck, HS, Va.
	Helen Thomas wreck, HS, Va.
	Isaac Solomon wreck, HS, Md.
	Julia Luckenbach wreck, HS, Va.
	Kettle Bottom Shoals Lower, 9A, Md.
	Newport News Upper Channel, Nos. 2, 4, 6, 8, Va.
	Rosalia d'Ali wreck, HS, Va.
	Thimble Shoal Channel, Nos. 4, 6, 8, 10, Va.
	Willoughby Spit 15 (bell), Va.
6th.....	Bethel Shoal, 10 (whistling), Fla.
	North Jetty End, 2 (bell), Fla.
8th.....	Aransas Pass, 2, Tex.
	South Pass, PS (whistling), La.
11th.....	Bar Point Channels, Mich. (2 buoys).
	Blake Point, 1 (bell), Mich.
	Chequamegon Bay, 1, Wis.
	Crab Island Shoal, 2, Mich.
	Livingstone Channel, Mich. (12 buoys).
	Marine City Shoal, 4, Mich.
	Rogers City Channel, 1, Mich.
	Stag Island Upper, HS, Mich.
	ESTABLISHED—continued.
12th.....	Boulder Reef, Mich.
	Little Bay de Noc, 8, Mich.
	Little Gull Island, 2 (bell), Mich.
	New Shoal, 3 (bell), Mich.
	Oconto Harbor Channel, 1 (bell), Wis.
	Rock Island Passage, 2, Wis.
17th.....	Clatsop Spit, 10, Oreg.
	Columbia River Outside Bar, PS (whistling), Wash.
	Neah Bay, 2 (whistling), Wash.
	South Jetty, 2 (whistling), Oreg.
19th.....	Channel, 10, Hawaii.
	DISCONTINUED (33).
2d.....	Lois V. Chaples wreck, HS, Mass.
	Nix Mate, 7 (bell), Mass.
	Pollock Rip, 1 (bell), Mass.
3d.....	Ambrose Channel Nos. 5AC, 14AC, N.Y.
	Barge wreck, HS, N. Y.
	City of Georgetown wreck, HS, Del.
	Massachusetts wreck, HS, Conn.
	Point Judith Breakwater (temporary), R. I.
5th.....	Andrew Johnson wreck, HS, Md.
	Bangor wreck, HS, Va.
	Barge wreck, HS, Va.
	Charmer wreck, HS, Va.
	C. W. Seward wreck, HS, Md.
	Helen Thomas wreck, HS, Va.
	Herbert B. Maxwell wreck, HS, Md.
	Isaac Solomon wreck, HS, Md.
	Newport News Middle Ground 30-Foot Channel, Nos. 2, 4, 6, 8, Va.
8th.....	Southwest Pass Entrance, PS (whistling), La.
11th.....	Bar Point Channels, Mich. (6 buoys).
12th.....	Gravelly Island Shoal, 1, Mich.
	New Shoal, 3, Mich.
	Poverty Island Shoal, 2, Mich.
18th.....	Four-and-one-half Fathom, Cal.
19th.....	Channel, 9, Hawaii.

FOG SIGNALS ESTABLISHED AND IMPROVED DURING THE FISCAL YEAR 1913.[a]

District.	Location.	Character.	
	ESTABLISHED (10).		
1st.....	Moose Peak, Me	1st-class reed horn.	
3d.....	Negro Point, N. Y	Bell struck by machinery.	
4th.....	Miah Maull Shoal, N. J	Do.	
10th.....	Buffalo Light Vessel No. 82, N. Y	6-inch steam whistle.	
12th.....	Milwaukee Light Vessel No. 95, Wis	12-inch steam whistle.	
	South Haven Pierhead, Mich	Hand fog horn.	
17th.....	Alki Point, Wash	3d-class reed horn.	
	Tacoma Waterway, Wash	Bell struck by electrical machinery.	
18th.....	Point Loma, Cal	1st-class air siren; in duplicate.	
	San Pedro Breakwater, Cal	Do.	
	IMPROVED (7).	*From—*	*To—*
2d.....	Hedge Fence Light Vessel No. 41, Mass	12-inch steam whistle.	1st-class air siren.
3d.....	Goat Island Shoal, R. I	Electric gong.	Bell struck by machinery.
	Rose Island, R. I	Bell.	1st-class reed horn; in duplicate.
11th.....	Superior Entry South Breakwater, Wis	6-inch steam whistle.	1st-class air siren; in duplicate.
17th.....	Destruction Island, Wash	1st-class steam siren.	Do.
18th.....	Alcatraz Fog Signal Station, Cal	Bell struck by machinery.	Electric sireno.
	Alcatraz Light Station, Cal	Do.	Do.

[a] No fog signals were discontinued during the fiscal year.

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FOG SIGNALS WHICH WILL PROBABLY BE ESTABLISHED DURING THE FISCAL YEAR 1914.

District.	Location.	Character.
1st.....	Hendersons Point, Me.....	Bell struck by machinery.
	Fiddlers Reach, Me.....	Do.
2d.....	Gallups Island, Mass.....	Bell operated by electricity.
3d.....	Aunt Phebe Rock, N. Y.....	Bell struck by machinery.
	Rondout, N. Y.....	Do.
5th.....	Fort McHenry, Md.....	Gong operated by electricity.
10th.....	Buffalo South Pier, N. Y.....	Bell struck by machinery.
12th.....	Manistique, Mich.....	Air siren.
18th.....	Seal Island, Cal.....	Sireno, electrically operated.

LIGHT VESSELS ESTABLISHED AND DISCONTINUED DURING THE FISCAL YEAR 1913.

District.	No. of vessel.	Name of station.
		ESTABLISHED (3).
8th.....	43.....	Southwest Pass, La.
10th.....	82.....	Buffalo, N. Y.
12th.....	95.....	Milwaukee, Wis.
		DISCONTINUED (1).
8th.....	43.....	South Pass, La.

No light vessels will probably be established during 1914.

SUBMARINE SIGNALS ESTABLISHED DURING THE FISCAL YEAR 1913.[a]

District.	Location.	District.	Location.
10th.....	Buffalo Light Vessel No. 82, N. Y.	17th.....	Orford Reef gas, whistling, and submarine bell buoy, 2 OR, Oreg. (operated by action of the sea).
11th.....	Whitefish Point, Mich. (bell struck by machinery).		

[a] None were discontinued during the year.

SUBMARINE SIGNALS IN COMMISSION ON JUNE 30, 1913.

[Unless otherwise stated, these signals are operated by compressed air (46 signals).]

District.	Location.	District.	Location.
1st.....	Portland Light Vessel No. 74, Me.	6th.....	Brunswick Light Vessel No. 84, Ga.
2d.....	Boston Light Vessel No. 54, Mass.		Frying-Pan Shoals Light Vessel No. 94, N. C.
	Great Round Shoal Light Vessel No. 86, Mass.		Martins Industry Light Vessel No. 1, S. C.
	Hedge Fence Light Vessel No. 41, Mass.	8th.....	Heald Bank Light Vessel No. 81, Tex.
	Nantucket Shoals Light Vessel No. 85, Mass.		Southwest Pass Light Vessel No. 43, La.
	Pollock Rip Light Vessel No. 47, Mass.	10th.....	Buffalo Light Vessel No. 82, N. Y.
	Pollock Rip Slue Light Vessel No. 73, Mass.	11th.....	Bar Point Shoal Light Vessel No. 62, Mich.
	Vineyard Sound Light Vessel No. 90, Mass.		Detour Light Station, Mich. (operated electrically from the shore).
	Peaked Hill Submarine Bell Buoy, 2A, Mass. (operated by action of sea).		Lake Huron Light Vessel No. 61, Mich.
3d.....	Ambrose Channel Light Vessel No. 87, N. Y.		Poe Reef Light Vessel No. 59, Mich.
	Barnegat Shoal Gas, Whistling, and Submarine Bell Buoy, 7B, N. J. (operated by action of the sea).		Whitefish Point Light Station, Mich. (operated electrically from the shore).
	Brenton Reef Light Vessel No. 39, R. I.	12th.....	Eleven-Foot Shoal Light Vessel No. 60, Mich.
	Cornfield Light Vessel No. 48, Conn.		Grays Reef Light Vessel No. 57, Mich.
	Fire Island Light Vessel No. 68, N. Y.		Lansing Shoal Light Vessel No. 55, Mich.
	Five-Fathom Bank Light Vessel No. 79, N. J.		North Manitou Shoal Light Vessel No. 56, Mich.
	Northeast End Light Vessel No. 44, N. J.		White Shoal Light Station, Mich. (operated electrically from lighthouse).
	Overfalls Light Vessel No. 69, Del.	17th.....	Columbia River Light Vessel No. 88, Oreg.
5th.....	Cape Charles Light Vessel No. 49, Va.		Orford Reef Gas, Whistling, and Submarine Bell Buoy, 2 OR, Oreg. (operated by action of the sea).
	Cape Lookout Shoals Light Vessel No. 80, N. C.		Swiftsure Bank Light Vessel No. 93, Wash.
	Diamond Shoal Light Vessel No. 71, N. C.		Umatilla Reef Light Vessel No. 67, Wash.
	Fenwick Island Light Vessel No. 52, Del.	18th.....	Blunts Reef Light Vessel No. 83, Cal.
	Tail of the Horseshoe Light Vessel No. 46, Va.		San Francisco Light Vessel No. 70, Cal.
	35-Foot Channel Light Vessel No. 45, Va.		
	Winter-Quarter Shoal Light Vessel No. 91, Va.		

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PRIVATE AIDS TO NAVIGATION MAINTAINED ON JUNE 30, 1913.

[Under the act of June 20, 1906.]

District.	Lights.	Buoys.		Other unlighted aids.	Fog signals.	Total.
		Lighted.	Unlighted.			
1st	0	0	37	3	0	40
2d	40	5	29	18	1	93
3d	26	2	38	2	2	70
5th	9	0	56	48	2	115
6th	3	4	2	4	0	13
7th	0	0	2	32	0	34
8th	13	0	28	37	0	78
9th	1	0	0	0	0	1
10th	34	3	6	0	3	46
11th	7	4	17	0	0	28
12th	31	0	8	0	5	44
13th	0	1	0	0	0	1
16th	1	0	2	3	0	6
17th	3	0	13	0	1	17
18th	9	0	1	0	2	12
19th	18	2	1	3	0	24
Total	195	21	240	150	16	622

AIDS MAINTAINED UNDER CONTRACT DURING THE FISCAL YEAR 1913.

District.	Name of aids.	Annual cost.
2d	South Boston Range Lights, Mass. (2 lights)	$377.16
	Wamsutta Mill Light, Mass	220.00
5th	Sand Shoal Inlet, Fishermans Inlet, and Magothy Bay, Va. (buoys and stakes)	100.00
6th	Little River Inlet, N. C. (4 bar buoys)	1.00
10th	Lake Ontario and the St. Lawrence River, N. Y. (38 buoys)	1,500.00
	Niagara River, N. Y. (45 buoys)	1,305.00
11th	Superior Bay, St. Louis Bay and River, Wis. and Minn. (32 lights)	1,300.00
12th	Fox River, Wis. (12 spar buoys); Green Bay, Wis. (16 spar buoys)	160.00
16th	St. Michaels, Alaska (9 post lights); Cape Stephens and Whale Island lights, Alaska.	610.00
	Cooks Inlet, Alaska (post lights)	109.25
	St. Michaels Canal and Apoon Pass, Alaska (15 keg and 15 barrel buoys); also Orizaba Reef Bell Buoy.	318.50
18th	Hookton Channel Range Rear Light, Cal	1.00
19th	Lahaina Buoy Light, Hawaii	1.00

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LIGHT VESSELS IN COMMISSION DURING THE FISCAL YEAR 1913.

Number.	Station.	District.	Tonnage.		When built.	Material of hull.	Dimensions.			Indicated horsepower (self-propelling).	Regular complement.		Fog signal.	Illuminant.	Cost of repairs made during fiscal year.	Cost of maintenance during fiscal year.	Original cost.	On station.	
			Gross.	Net.			Length (on water line).	Breadth.	Depth.		Officers.	Crew.						Months.	Days.
							Ft. in.	Ft. in.	Ft. in.										
74	Portland, Me.	1	a 495	.....	1902	Wood...	118 0	28 6	13 0	380	4	8	12" steam whistle b	Acet.	$496	$10,285	$88,896	12	....
3	Shovelful Shoal, Mass.	2	140	.....	1852	...do....	69 0	23 0	10 0	.....	2	5	Bell or horn	Oil.	756	4,341	12,000	9	10
4	Handkerchief, Mass	2	104	.....	1855	...do....	77 0	20 0	10 0	.....	2	5	.....do	...do.	481	4,224	.....	9	22
5	Cross Rip, Mass.	2	171	.....	1864	...do....	81 6	21 6	9 0	.....	2	6	8" air whistle	...do.	1,748	5,629	.....	9	5
6	Relief.	2	140	.....	.....	...do....	80 0	24 0	10 0	.....	1	0	Bell	...do.	281	488	.....	7	24
9	.....do	2	181	.....	1857	...do....	81 2	28 2	9 6	.....	1	1	8" air whistle	...do.	1,313	1,885	19,883	11	18
41	Hedge Fence Shoal, Mass.	2	387	.....	1876	...do....	114 0	26 9	11 0	.....	2	6	First-class air siren b	...do.	11,208	5,773	33,000	2	25
42	Hen and Chickens Shoal, Mass.	2	410	.....	1877	...do....	114 0	26 6	10 6	.....	3	7	10" air whistle	...do.	691	7,511	40,796	12	....
47	Pollock Rip, Mass.	2	296	.....	1891	Comp...	112 0	26 6	11 0	.....	4	6	12" steam chime wh.b	...do.	4,576	7,671	60,000	8	1
54	Boston, Mass.	2	310	.....	1892	Steel...	118 0	26 0	11 0	135	4	8	12" steam whistle b	...do.	180	9,178	62,030	12	....
66	Relief c	2	a 538	.....	1896	Comp...	112 0	28 6	13 0	350	2	6	12" steam chime wh.b	O. or el.	1,508	8,321	69,282	8	10
73	Pollock Rip Slue, Mass.	2	a 538	.....	1901	Steel...	112 0	28 6	12 9	400	4	8	.....do.b	Oil.	1,894	10,144	79,872	10	9
85	Nantucket Shoals, Mass.c	2	488	246	1907	...do....	112 11	29 0	13 0	380	5	10	12" steam whistle b	El. inc.	4,022	13,252	99,000	8	17
86	Great Round Shoal, Mass.	2	488	246	1907	...do....	112 11	29 0	13 0	380	4	8	.....do.b	Oil.	2,380	10,904	99,000	10	29
90	Vineyard Sound, Mass.	2	477	225	1908	...do....	112 11	29 6	13 0	400	4	8	12" steam chime wh.b	...do.	1,190	10,507	107,213	10	14
11	Scotland, N. J.	3	320	.....	1853	Wood...	104 0	24 8	11 6	.....	2	6	Bell	Oil gas.	165	5,041	13,462	12	....
13	Bartlett Reef, Conn.	3	155	.....	1854	...do....	79 8	21 8	10 4	.....	2	5	.....do	Oil.	942	4,507	12,000	10	15
16	Relief.	3	250	.....	1854	...do....	103 6	22 6	11 0	.....	0	1	First-class air siren b	...do.	1,209	1,119	28,084	12	....
20	.....do	3	165	.....	1867	...do....	81 6	21 6	10 0	.....	0	1	Bell	...do.	56	892	25,040	2	27
23	Ram Island Reef, N. Y.	3	186	.....	1857	...do....	94 0	24 0	9 0	.....	2	5	.....do	...do.	30	4,317	7,500	12	....
39	Brenton Reef, R. I.	3	387	.....	1875	...do....	114 4	26 9	13 0	.....	4	6	12" and 6" steam wh.b	...do.	2,158	8,142	42,200	10	19
44	Northeast End, N. J.	3	197	.....	1882	Iron....	113 0	25 0	10 6	.....	4	7	Steam siren b	Acet.	753	8,329	50,000	10	10
48	Cornfield Point, Conn.	3	296	.....	1891	Comp...	112 0	27 8	12 0	.....	4	5	First-class air siren b	...do.	18,329	7,114	52,780	.....	.....
51	Relief.	3	283	.....	1892	Steel...	110 0	26 9	11 0	135	2	3	12" steam whistle b	El. inc.	2,398	4,901	53,325	8	10
68	Fire Island, N. Y.	3	450	204	1897	Comp...	112 0	28 6	12 6	350	4	10	12" steam chime wh.b	...do.	2,399	11,274	74,750	10	8
69	Overfalls, Del.	3	407	204	1897	...do....	112 6	29 6	13 0	350	4	10	.....do.b	...do.	2,359	11,601	79,500	10	16
79	Five-Fathom Bank, N. J.	3	465	188	1904	Steel...	112 9	28 6	12 6	325	4	8	.....do.b	Oil.	1,353	9,738	89,000	10	8
87	Ambrose Channel, N. Y.	3	488	246	1907	...do....	112 11	29 0	13 0	325	4	10	12" steam whistle b	El. arc.	1,457	12,033	99,000	10	10
2	Relief.	5	210	.....	1849	Wood...	98 0	25 0	9 0	.....	.....	1	Bell	Oil.	426	533	12,402	11	16
45	Thirty-Five Foot Channel, Va.	5	285	285	1887	Steel d	120 9	27 6	12 0	.....	2	6	8" air chime whistle b	...do.	549	6,638	58,500	11	10

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46	Tail of the Horseshoe, Va	5	285	.....	1887	...do....	119	0	27	6	12	0	.....	4	6	12" steam whistle [b]	...do....	195	8,055	60,000	10	22
49	Cape Charles, Va	5	296	.....	1890	Comp...	112	0	27	0	14	0	.....	4	6	.....do.[b]	...do....	624	8,495	57,900	7	15
52	Fenwick Island Shoal, Del	5	289	197	1892	Steel....	118	6	26	6	12	0	.....	4	8	First-class air siren [b]	...do....	283	9,793	62,000	9	23
71	Diamond Shoal, N. C.[c]	5	450	204	1897	Comp...	112	0	28	6	13	0	350	5	10	12" steam chime wh.[b]	El. inc ..	24,142	12,840	70,700	2	15
72	Relief [c]	5	[a] 538	.....	1900	Steel....	112	0	28	6	14	0	350	2	6	.....do.[b]	...do....	599	12,748	89,000	11	23
78	Relief	5	450	188	1904	...do....	112	9	28	6	12	6	325	2	3	12" steam whistle [b]	Oil.....	1	2,390	89,030	9	18
80	Cape Lookout Shoals, N. C	5	465	188	1904	...do....	112	9	28	6	12	6	500	4	8	12" steam chime wh.[b]	...do....	6,219	11,880	85,000	6	25
91	Winter-Quarter Shoals, Va	5	477	225	1908	...do....	112	11	29	0	13	0	400	4	8	8" steam chime wh.[b]	...do....	1,931	10,229	107,213	12	....
97	Bush Bluff, Va	5	87	.....	1876	Comp...	60	0	19	5	12	0	.....	1	2	Bell	El. inc ..	5,844	2,870	.....	2	15
1	Martins Industry, S. C	6	275	.....	1855	Wood...	103	0	24	0	13	0	.....	4	6	12" steam whistle [b]	Oil.....	59	8,661	.....	12	....
29	Relief	6	232	150	1864	...do....	98	0	23	6	10	6	.....	1	2	Bell	...do....	587	2,625	.....	4	29
34	Charleston, S. C	6	150	.....	1864	...do....	95	0	23	0	10	0	.....	2	6	8" air chime whistle	...do....	5,739	5,924	48,000	12	....
53	Relief [c]	6	310	.....	1892	Steel....	112	0	26	6	11	0	135	4	8	12" steam whistle [b]	...do....	37,693	3,883	61,538	....	....
84	Brunswick, Ga	6	488	246	1907	...do....	112	11	29	0	13	0	325	4	8	.....do.[b]	...do....	1,915	11,053	99,000	10	14
94	Frying Pan Shoals, N. C.[c]	6	488	229	1911	...do....	112	11	29	0	13	0	363	4	10	12" steam chime wh.[b]	Inc. O.V.	3,038	12,221	104,604	8	15
43	Southwest Pass, La	8	191	110	1881	Comp...	100	9	25	0	12	0	.....	4	6	12" steam whistle [b]	Oil.....	4,367	8,217	50,000	8	13
81	Heald Bank, Tex	8	465	188	1904	Steel....	112	9	28	6	12	6	325	4	8	.....do.[b]	...do....	2,172	10,381	90,000	9	24
82	Buffalo, N. Y	10	171	61	1912	...do....	80	0	21	0	8	11	90	4	2	10" steam whistle [b]	...do....	611	5,390	42,910	6	6
59	Poe Reef, Mich	11	105	101	1893	Wood...	80	0	21	6	9	6	.....	3	3	6" steam whistle [b]	...do....	1,515	4,325	25,000	6	26
61	Lake Huron, Mich	11	105	101	1893	...do....	80	6	21	0	9	0	.....	3	3	.....do.[b]	...do....	213	3,863	14,098	7	14
62	Bar Point Shoal, Mich	11	105	101	1893	...do....	80	0	21	6	8	0	.....	3	3	.....do.[b]	...do....	1,083	4,312	14,098	7	25
75	Lake St. Clair, Mich	11	160	.....	1902	Steel....	75	0	24	0	4	9	.....	2	2	Bell	...do....	253	2,963	14,983	7	21
89	Martin Reef, Mich	11	.....	76	1908	...do....	80	0	21	0	10	0	90	4	2	6" steam whistle	...do....	584	5,225	37,500	7	12
55	Lansing Shoal, Mich	12	129	100	1891	Wood...	90	0	20	0	9	0	100	4	2	6" steam whistle [b]	...do....	1,245	5,395	13,600	7	12
56	North Manitou Shoal, Mich	12	130	101	1891	...do....	90	0	20	0	8	10	100	4	2	.....do.[b]	...do....	1,883	5,572	13,600	7	18
57	Grays Reef, Mich	12	130	101	1891	...do....	90	0	20	0	8	10	100	4	2	.....do.[b]	...do....	976	5,544	13,600	7	19
60	Eleven-Foot Shoal, Mich	12	105	101	1893	...do....	80	0	21	6	8	6	.....	3	3	.....do.[b]	...do....	1,316	4,512	13,990	7	12
77	Peshtigo Reef, Wis	12	[a] 155	.....	1906	Steel....	75	0	21	6	4	0	.....	2	3	8" air whistle	...do....	356	3,636	13,950	7	9
95	Milwaukee, Wis	12	230	156	1912	...do....	90	0	23	0	10	2	200	4	5	12" steam whistle	...do....	1,706	5,879	69,850	6	12
50	Laid up at Astoria, Oreg	17	296	.....	1892	Comp...	112	0	26	9	11	3	.....	.....	2	.....do	...do....	3	1,279	61,150	.....	.....
67	Umatilla Reef, Wash	17	450	364	1897	...do....	112	0	28	6	13	0	200	4	10	12" steam chime wh.[b]	...do....	7,101	13,875	69,750	9	19
88	Columbia River, Oreg	17	488	246	1907	Steel....	112	11	29	0	13	0	325	4	10	12" steam whistle [b]	...do....	1,214	13,660	99,000	7	11
92	Relief	17	477	225	1908	...do....	112	11	29	0	13	0	400	2	5	.....do.[b]	...do....	1,182	13,117	107,213	8	26
93	Swiftsure Bank, Wash	17	477	225	1908	...do....	112	11	29	0	13	0	400	4	10	.....do.[b]	...do....	968	17,221	107,213	10	2
70	San Francisco, Cal	18	400	.....	1897	Comp...	112	0	28	6	13	0	300	4	10	.....do.[b]	El. inc ..	3,448	15,948	79,000	8	17
76	Relief	18	429	169	1904	Steel....	117	7	28	8	12	0	400	2	5	.....do.[b]	Oil.....	6,143	10,679	90,000	7	6
83	Blunts Reef, Cal	18	465	188	1904	...do....	112	9	28	6	13	0	380	4	10	.....do.[b]	...do....	4,340	15,852	90,000	8	11

[a] Displacement.
[b] Submarine signal.
[c] Equipped with wireless telegraph radio.
[d] Wood sheathed.

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TENDERS OF THE LIGHTHOUSE SERVICE IN COMMISSION DURING THE FISCAL YEAR 1913.

Name.	District.	Tonnage.		When built.	Description.	Material of hull.	Dimensions.			Draft aft.		Indicated horsepower.	Regular complement.		Miles steamed.	Coal consumed for all purposes.	Cost of repairs.	Cost of maintenance.	Original cost.
		Gross.	Net.				Length on water line.	Breadth.	Depth.	Light.	Loaded.		Officers.	Crew.					
							Feet.	*Feet.*	*Feet.*	*Ft. in.*	*Ft. in.*					*Tons.*			
Hibiscus	1	677	300	1908	Steamer, screw	Steel	174	30	16	12 0	13 6	1,000	6	23	11,458	2,065	$998	$38,666	$184,643
Zizania	1	417	331	1888	...do	...do	150	27	12	9 0	9 0	650	6	19	11,851	1,326	1,519	29,520	48,739
Anemone	2	677	300	1908	...do	...do	174	30	16	12 0	13 0	1,000	6	23	13,688	2,147	2,392	34,814	191,999
Azalea	2	a 500	.....	1891	...do	...do	145	25	12	.....	10 6	400	5	19	13,136	809	1,774	24,622	79,792
Mayflower	2	572	392	1897	...do	...do	155	30	12	9 0	8 6	650	5	22	9,613	1,537	1,844	30,773	74,872
Daisy	3	35	12	1892	...do	Wood	74	14	5	5 0	6 0	60	2	4	8,048	147	1,792	6,417	6,500
Gardenia	3	150	83	1879	...do	...do	117	20	9	9 0	8 0	200	4	11	9,194	378	347	13,984	11,000
John Rodgers	3	260	.....	1883	Steamer, side-wheel	Iron	151	27	9	7 0	8 0	260	4	16	7,138	814	5,971	19,312	59,987
Larkspur	3	685	.....	1903	Steamer, screw	Steel	162	30	14	9 6	11 0	1,137	6	22	12,986	1,968	1,644	30,668	123,259
Mistletoe	3	352	176	1872	Steamer, side-wheel	Wood	153	26	9	7 6	7 0	370	4	16	6,271	603	2,842	18,441	45,833
Myrtle	3	348	240	1872	Steamer, screw	...do	130	25	11	11 6	13 0	225	0	2	.....	.....	10,832	1,315	44,500
Pansy	3	314	157	1878	...do	Iron	147	25	11	.....	7 6	250	4	17	6,646	977	1,859	20,317	48,739
Tulip	3	677	.....	1908	...do	Steel	174	30	16	.....	13 6	1,000	6	24	18,554	2,264	1,448	35,625	191,658
Iris	4	428	292	1897	...do	...do	142	30	10	9 6	10 0	800	4	19	13,114	1,330	7,626	25,873	84,407
Holly	5	367	142	1881	Steamer, side-wheel	Comp	167	24	10	7 0	8 6	400	4	16	9,389	801	306	21,297	41,911
Jessamine	5	257	155	1881	...do	Iron	146	24	10	7 6	.....	350	4	16	5,108	602	2,364	19,755	41,911
Juniper	5	84	57	1903	Steamer, screw	Steel	90	18	8	4 6	5 6	290	2	4	11,593	432	933	6,648	29,425
Maple	5	392	205	1893	...do	...do	155	30	12	8 0	9 6	650	6	22	14,998	1,523	2,670	29,429	93,889
Orchid	5	677	300	1908	...do	...do	174	30	16	12 6	13 0	1,000	6	23	14,200	1,932	2,646	32,129	186,151
Thistle b	5	32	16	1890	...do	Wood	60	15	7	7 0	7 9	45	.....	1	.....	.....	.....	639	9,600
Cypress	6	677	300	1908	...do	Steel	174	30	16	11 8	13 3	1,000	6	23	18,544	2,481	6,356	36,604	191,633
Lilac	6	434	212	1892	...do	...do	145	27	15	11 0	13 0	800	5	19	2,955	301	29,746	14,652	92,125
Snowdrop	6	32	19	1896	Gasoline, screw	Wood	61	11	5	3 2	4 0	32	2	2	7,333	c 6	781	4,994	9,700
Water Lily	6	33	19	1895	...do	...do	61	11	5	3 0	3 8	36	2	2	8,980	d 5	78	4,912	9,261
Mangrove	6,7	572	392	1897	Steamer, screw	Steel	165	30	12	8 0	8 6	550	6	22	8,610	1,319	5,779	29,539	74,998
Magnolia	7,8	550	.....	1904	...do	...do	165	30	13	8 0	10 0	720	5	22	10,048	1,317	7,511	31,366	124,874

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Arbutus	8	400	75	1879	do	Wood	145	25	11	8	3	9	6	360	6	19	9,684	908	3,196	23,916	49,769
Camellia	8	183	125	1911	do	Steel	106	24	10	6	5	7	3	285	4	12	7,237	497	1,546	16,601	55,049
Sunflower	8	a 797	.....	1907	do	do	163	31	15	11	10	.....		900	6	22	13,450	1,985	3,838	30,504	124,958
Ivy	9	550	.....	1904	do	do	165	30	13	8	6	11	6	700	5	22	10,358	1,368	1,466	31,149	123,900
Crocus	10	a 626	.....	1904	do	do	155	29	14	.....		10	10	700	6	22	9,177	1,655	4,867	30,960	119,718
Amaranth	11	744	488	1892	do	do	150	28	14	11	6	12	10	672	5	19	8,605	1,116	24,311	24,494	74,994
Aspen	11	277	82	1906	do	do	118	25	12	9	6	9	6	440	4	8	9,463	635	1,003	15,322	70,573
Marigold	11	454	262	1890	do	Iron	150	27	12	11	3	11	6	550	5	19	11,192	994	4,157	26,579	84,871
Clover b	12	96	65	1899	do	Wood	88	22	7	8	0	7	8	140	.....	.....	.....	.....	8,917	152	.....
Hyacinth	12	738	486	1903	do	Steel	150	28	14	11	0	12	0	878	5	19	9,355	1,344	3,780	25,845	115,000
Sumac	12	681	386	1903	do	do	160	30	13	11	3	13	0	700	5	22	14,080	1,743	4,210	30,887	114,982
Goldenrod	13,14	461	143	1888	Steamer, stern-wheel	do	150	27	4	2	4	2	6	152	3	15	5,987	881	1,684	19,758	33,221
Oleander	15	344	.....	1903	do	do	165	34	7	3	8	3	8	600	3	15	8,385	1,545	222	28,270	60,000
Columbine	16	424	212	1892	Steamer, screw	do	145	27	15	11	10	12	10	800	6	19	13,839	1,450	3,117	39,572	93,993
Heather	17	a 731	.....	1908	do	do	165	28	15	11	0	12	6	685	6	19	9,853	1,517	2,413	32,331	118,598
Manzanita	17	677	300	1906	do	do	174	30	16	13	1	12	0	1,000	6	23	11,897	1,757	1,280	41,837	211,817
Madrono	18	411	206	1885	do	Iron	164	27	15	11	0	13	0	700	5	19	8,750	1,041	3,690	31,144	87,872
Sequoia	18	677	300	1906	do	Steel	174	30	16	13	1	11	10	1,000	6	23	12,166	1,570	1,704	40,357	213,499
Kukui f	19	677	300	1906	do	do	174	30	16	13	0	13	0	1,000	6	23	8,970	1,373	3,542	44,756	213,880

a Displacement.
b Sold Dec. 6, 1912.
c Also 6,271 gallons gasoline.
d Also 6,748 gallons gasoline.
e Under extensive repair at Milwaukee.
f Equipped with wireless telegraph.

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LIGHTHOUSE TENDER SOLD DURING THE FISCAL YEAR 1913.

The lighthouse tender *Thistle* was sold on December 6, 1912, for $1,100, being unserviceable and of no further use to the Service.

CONSTRUCTION OF TENDERS AND LIGHT VESSELS.

Tender Clover (formerly Two Myrtles).—This vessel was purchased in 1908 for use in connection with the construction of White Shoal Light Station, and on completion of this work was laid up at Milwaukee depot. During the past year the vessel has been fitted with a new boiler and machinery and is now being completed and equipped as a tender for general service. The repairs and alterations are being made out of general appropriations.

Tender Fern.—Acts of May 27, 1908, and March 4, 1909, appropriated $200,000 for one tender (*Aster*), and the act of July 27, 1912, authorized the use of this amount for the construction of two tenders for general service. As one of these, it is proposed to build a small tender for service in the inside waters of Alaska. Plans and specifications are now under consideration. Amount expended to June 30, 1913, $56.50.

Tender Palmetto.—Appropriation act May 27, 1908, $30,000. Owing to the rearrangement of the use of tenders this vessel was not immediately needed and its construction was deferred. Plans are being prepared for a light-draft tender for use in the inside waters of the sixth district. Amount expended to June 30, 1913, $1,770.73.

Tender Laurel.—Appropriation act March 4, 1907, $60,000 for a tender for the fifteenth district (*Dandelion*); authority of act of July 27, 1912, to use this appropriation for a tender for general service. Plans have been prepared for a small tender for work in the inside waters of the Atlantic coast, and on September 9, 1913, subsequent to the close of the fiscal year, a contract was awarded for its construction. Amount expended to June 30, 1913, $3,437.18.

Tender Pansy.—The act of March 4, 1909, appropriated $12,000 for repairs to the lighthouse tender *Pansy*. A new boiler has been installed, the engines compounded, and extensive repairs are now well under way. Amount expended to June 30, 1913, $311.93.

Tender Rose.—Acts of May 27, 1908, and March 4, 1909, appropriated $200,000 for one tender (*Aster*), and the act of July 27, 1912, authorized the use of this amount for the construction of two tenders for general service. As one of these, it is proposed to build a tender of moderate size and draft for use in the small harbors and inside waters of the coasts of Oregon and Washington. Plans and specifications are now under consideration. Amount expended to June 30, 1913, $113.

Tender Woodbine.—Appropriation act March 4, 1907, $25,000. This tender was placed under contract at West New Brighton, N. Y. The failure of the contractors delayed the completion of the vessel and on October 22, 1912, it was taken over by the Government under a supplemental contract and is now being completed by the Bureau. An internal-combustion engine using kerosene oil has been substituted for the steam-propelling plant and such structural modifications made, including a 3-ton derrick, that the vessel will become an efficient working tender. Amount expended to June 30, 1913, $21,859.98.

Light vessel No. 95 (Milwaukee).—Appropriation act May 27, 1908, $75,000. This vessel was constructed at Muskegon, Mich., and completion was delayed owing to the failure of the contractors. It was completed by the Government September 27, 1912, and was placed on station November 30, 1912. A detailed description of the vessel is given on page 103 of Annual Report, 1912. Amount expended to June 30, 1913, $71,662.13.

Light vessel No. 96 (Buffalo).—Appropriation act March 4, 1911, $75,000 for a light vessel for service at or near a point between Point Abino and Sturgeon Point in Lake Erie. Plans and specifications were prepared for a nonpropelling light vessel having an over-all length of about 102 feet and a displacement of 240 tons. It will be fitted with one lantern mast, carrying a lens with the focal plane about 40 feet above water, and fog signal. The quarters for the officers and crew will be located on the main deck and the vessel will be fitted with all modern appliances. Contract was entered into on April 24, 1913, with the Racine-Truscott-Shell Lake Boat Co., Muskegon, Mich., for the construction of this vessel, and on June 30, 1913, the work was well under way. The contract price is $69,850. Amount expended to June 30, 1913, $1,774.48.

Light vessel No. 98.—Act of August 26, 1912, appropriated $250,000 for light vessels for general service. As one of these, it was decided to build a duplicate of *No. 96*, the design of which was approaching completion, for service on the Lakes. Bids were received for this vessel under the advertisement and specifications of light vessel

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No. 96 and contract was entered into on April 24, 1913, with the Racine-Truscott-Shell Lake Boat Co., Muskegon, Mich., for its construction, and on June 30, 1913, the work was well under way. The contract price is $69,850. Amount expended to June 30, 1913, $206.91.

Light vessels No. 99 and No. 101.—Act of August 26, 1912, appropriated $250,000 for light vessels for general service. It is proposed to build three vessels from this appropriation, light vessel *No. 98*, as noted above, and a large (*No. 99*) and small (*No. 101*) vessel for stations on the Atlantic coast to take the place of vessels that may have to be withdrawn because of deterioration due to age and service. A preliminary design of each vessel has been prepared. Amount expended to June 30, 1913, light vessel *No. 99*, $2,195.33; light vessel *No. 101*, $190.

Light vessel No. 100.—The act of August 24, 1912, appropriated $130,000 for a light vessel for general service. It is proposed to build a large vessel that will be suitable for Nantucket or some other important exposed station. No expenditures to June 30, 1913.

Light vessel No. 102 (Southwest Pass).—The act of October 22, 1913, after the close of the fiscal year, appropriated $125,000 for a light vessel for the Southwest Pass Entrance to the Mississippi River, La. It is proposed to build a vessel similar to *No. 101*, suitable for use on this station.

SPECIAL WORKS OF CONSTRUCTION COMPLETED (OMITTING VESSELS).

FIRST DISTRICT.

Monhegan (Manana) Island, Me.—The act of March 4, 1911, appropriated $10,000 for improving the light and fog signal at Monhegan Island, Me. The fog signal was improved by replacing the Daboll trumpet with a first-class siren, which was placed in commission February 23, 1913. The light was changed from oil to incandescent oil vapor on September 25, 1912. The total cost to June 30, 1913, was $8,061.17.

THIRD DISTRICT.

Point Judith Breakwater, R. I.—The act of March 4, 1909, appropriated $12,000 for establishing lights and fog signals on the breakwater of the Harbor of Refuge, Point Judith, R. I. Four lights were completed and went into commission on October 22, 1912. They consist of hollow cast-iron columns with a tank house around the top for holding the acetylene gas tanks. The total cost to June 30, 1913, was $9,547.16.

Greenville, N. J.—The act of May 27, 1908, appropriated $9,000 for a light and signal or whistling buoy fitted with submarine bell, to be placed at or near the entrance to the dredged channel at Greenville, N. J., in New York Bay. After due consideration it was found that on account of the shallow water at this point a buoy such as specified in the act would not operate successfully. A gas and bell buoy such as is used elsewhere in the Service was therefore established at this point from the general appropriation, which it is believed answers all requirements of navigation. The full amount of the special appropriation has been covered into the Treasury.

FOURTH DISTRICT.

Edgemoor Lighthouse Depot, Del.—The act of March 4, 1911, appropriated $30,000 for the reconstruction of the wharves and sea wall and for other improvements at this depot. The two wharves have been rebuilt, and about 60 linear feet of stone sea wall constructed. The project was completed on January 26, 1913, at a total cost of $29,968.43.

TWELFTH DISTRICT.

North Point, Wis.—The act of March 4, 1909, appropriated $10,000 for raising the tower of the North Point Light Station 30 feet. The work has been completed and light at new height went into commission December 15, 1912. Amount expended to June 30, 1913, $9,516.15.

SEVENTEENTH DISTRICT.

Alki (Battery) Point, Wash.—The acts of June 28, 1902, March 4, 1907, and March 4, 1911, appropriated $47,000 for the construction of a light and fog signal station at Alki (Battery) Point, at the entrance to Seattle Harbor. The station was finished and placed in commission on June 1, 1913. The light and fog signal building is a concrete structure, and two frame dwellings are provided for the keepers. The

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light is a fourth order, showing a group of five white flashes, and is of 16,600 candlepower. The fog signal is a third-class Daboll trumpet operated by compressed air, and is fitted with three horns. The total cost to June 30, 1913, was $45,962.71.

San Pedro Breakwater, Cal.—The act of March 4, 1911, appropriated $36,000 for establishing a light and fog signal station on the San Pedro Breakwater, Cal. The lighthouse was completed during the year and placed in commission on March 1, 1913. It consists of a structural steel framework, the lower section containing fog-signal machinery, being built of metal plate. The upper section is built of cement plaster on metal lath and contains quarters for three keepers. The light apparatus is a fourth-order flashing bivalve lens with oil vapor lamp, of approximately 69,000 candlepower, shown at a height of 73 feet above the water. The fog signal is a first-class compressed-air siren; compressor and gas engine are direct connected, and the plant is in duplicate. The total cost to June 30, 1913, was $35,225.58.

Point Loma, Cal.—The act of August 24, 1912, appropriated $17,500 for establishing a fog signal and additional quarters at Point Loma Light Station, San Diego Harbor, Cal. The fog-signal building was completed and fog signal put in commission on March 1, 1913. The dwelling was completed June 25, 1913. The fog-signal building and dwelling are built of hollow terra cotta blocks, plastered on exterior and interior; roofs covered with asbestos shingles. The fog signal is a first-class compressed-air siren, compressor and gas engine being direct connected; plant in duplicate. The total cost to June 30, 1913, was $17,122.55.

Makapuu Point, Hawaii.—The act of June 30, 1906, appropriated $60,000 for the establishment of a light and fog signal station at this point. An occulting white, hyperradiant light was established on October 1, 1909, about 420 feet above the water and 25 feet above the ground, on a tower 20 feet in diameter at the base, surmounted by a 16-foot lantern, at a cost of $55,818.67. The balance of the appropriation was expended during the year for a pipe line for permanent gravity water supply. Mountain water is piped 8 miles to the station into a concrete and stone tank for distribution by gravity.

SPECIAL WORKS OF CONSTRUCTION UNCOMPLETED (OMITTING VESSELS).

Storehouses for oil.—The act of May 27, 1908, appropriated $3,000 for two oil houses at a cost not to exceed $1,500 each, to be erected at such places as are considered for the best interests of the Lighthouse Service. An oil house was completed on October 19, 1912, at the Edgemoor lighthouse depot, Del., at a total cost of $1,489.02. It is expected that the other oil house to be built under this appropriation, at Woods Hole lighthouse depot, Mass., will be completed in June, 1914.

Oil houses for light stations.—The acts of May 27, 1908, March 4, 1909, and June 25, 1910, each appropriated $10,000 for establishing isolated oil houses for the storage of mineral oil. On June 30, 1913, there was an unexpended balance of $16,102.57 under these appropriations. During the fiscal year oil houses were completed at the following-named stations:

	Amount expended.		Amount expended.
Manana Island, Me.	$543.63	Cubits Gap, La.	$526.65
Halfway Rock, Me.	245.90	St. Joseph, Mich.	547.78
Nantucket (Great Point), Mass.	388.59	Point Loma, Cal.	518.00
Washington lighthouse depot, N. C.	303.47	Barbers Point, Hawaii	297.49
		Diamond Head, Hawaii.	385.57

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Work was also in progress toward the construction of oil houses at the following-named stations:

Station.	Probable date of completion.	Amount expended.	Station.	Probable date of completion.	Amount expended.
Execution Rocks, N. Y..	July 15, 1913	$153.25	Muertos Island, P. R....	Dec. 31, 1913	None.
Delaware Breakwater			Cardona Island, P. R....	.....do.....	None.
Range Front, Del.....	July 31, 1913	362.17	Guanica, P. R.....	.....do.....	None.
Fowey Rocks, Fla.....	Aug. 1, 1913	320.73	Cape Rojo, P. R.....	.....do.....	None.
Alligator Reef, Fla	.....do.....	320.73	Point Borinquen, P. R..	.....do.....	None.
Sombrero Key, Fla.....	.....do.....	320.73	Arecibo, P. R.....	.....do.....	None.
American Shoal, Fla....	.....do.....	320.73	Braddock Point, N. Y...	Nov. 1, 1913	$101.21
Rebecca Shoal, Fla.....	.....do.....	None.	Pentwater, Mich.....	July 10, 1913	521.80
Culebrita Island, P. R...	Dec. 31, 1913	None.	Portage Lake, Mich.....	July 1, 1913	536.29
Cabras Island, P. R.....	.....do.....	None.	Turn Point, Wash.....	Oct. 1, 1913	300.00
Mona Island, P. R.....	.....do.....	None.	Point Wilson, Wash.....	Sept. 15, 1913	300.00
Jobos Harbor, P. R	.....do.....	None.	Robinson Point, Wash..	Oct. 15, 1913	300.00
Cape San Juan, P. R....	.....do.....	None.	Alki Point, Wash.....	Aug. 31, 1913	450.00
Point Mulas, P. R.....	.....do.....	None.	Farallon, Cal.....	Aug. 15, 1913	220.00
Point Tuna, P. R.....	.....do.....	None.	Point Hueneme, Cal.....	Jan. 1, 1914	None.
Point Figuras, P. R.....	.....do.....	None.			

Light keepers' dwellings.—The act of May 27, 1908, appropriated $75,000 for light keepers' dwellings and appurtenant structures, including sites therefor. The following work was accomplished during the past fiscal year under this appropriation: A dwelling was completed at the Duluth Range Lights, Minn., at a cost of $6,477.31. The purchase of materials and preparation of plans for the construction of a dwelling for the keepers of the Kauhola Point Light Station, Hawaii, were under way. The dwelling will probably be completed in December, 1913. On June 30, 1913, the unexpended balance under the appropriation amounted to $5,582.45.

THIRD DISTRICT.

Staten Island, N. Y., and West Bank, N. J.—The acts of June 30, 1906, and March 4, 1909, each appropriated $50,000 for a lighthouse on Staten Island. N. Y., and the raising of West Bank Light, N. J. This act of June 30, 1906, also appropriated $10,000 for a temporary structure to maintain West Bank Light while being raised, and a temporary structure for North Hook Light while being moved. All work except laying of sidewalks at Staten Island has been completed, and the new light was put into operation on April 15, 1912. Amount expended to June 30, 1913, $71,037.33.

Passaic, N. J.—The act of March 4, 1907, appropriated $15,000 for a light and fog signal station at or near the west end of the draw near the Lehigh Valley Railroad bridge at Passaic, N. J. Work on this project has been deferred pending the authorization by Congress to use the balance of this appropriation for establishing four small flashing acetylene lights in place of one light and fog signal, the four small lights being preferred by maritime interests using this channel, which authority has been granted since the close of the year. Amount expended to June 30, 1913, $656.75.

Negro Point, N. Y.—The act of May 27, 1908, appropriated $10,000 for a light and fog signal station at or near Negro Point, on Wards Island, Hell Gate, East River, N. Y. All work has been completed with the exception of the installation of electric attachment for fog-bell striker, which it is expected will be completed in the fall of 1913. The light and fog signal went into commission on January 20, 1913. Amount expended to June 30, 1913, $3,461.48.

Stonington, Conn.—The act of March 4, 1911, appropriated $500 for the repair of the sea wall at Stonington Point, Conn. It is expected that the work will be completed in the fall of 1913. Amount expended to June 30, 1913, $7.73.

Staten Island lighthouse depot, N. Y.—The act of March 4, 1911, appropriated $40,000 for repair and extension of wharves at the general lighthouse depot, Staten Island, N. Y. Contract was entered into for extending one wharf, and the work was completed on June 5, 1913. Amount expended to June 30, 1913, $29,244.13. Further work will be done on the repair of present wharves. The act of March 4, 1911, also appropriated $30,000 for constructing a power house and foundry and for completing the equipment, wiring, etc., of the power plant at the general lighthouse depot, Staten Island, N. Y. The power house and foundry buildings have been completed, and the installation of the machinery was about 98 per cent completed

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on June 30, 1913. It is expected that all work will be completed about December 15, 1913. Amount expended to June 30, 1913, $29,045.11.

Rondout Creek, Hudson River, N. Y.—The act of March 4, 1911, appropriated $40,000 for establishing a light and fog signal station at or near the mouth of Rondout Creek, Hudson River, N. Y. Site has been obtained, and the plans and specifications are in the hands of the printer. It is expected that the work will be completed about December 1, 1914. Nothing expended to June 30, 1913.

Hunts Point, N. Y.—The act of March 4, 1911, appropriated $5,000 for the establishment of a light and fog signal to mark Hunts Point, between Hell Gate and Whitestone Point, East River, N. Y. On June 30, 1913, steps had been taken for procuring a site for this light station from the State of New York, but no action has as yet been taken by the State. No expenditure had been made from this appropriation, and the date of completion depends on the acquisition of a site.

FOURTH DISTRICT.

Miah Maull Shoal, N. J.—Appropriations were made by the acts of June 30, 1906 ($40,000), March 4, 1907 ($35,000), and March 4, 1911 ($30,000) for a light and fog signal station at Miah Maull Shoal, Delaware River. The foundation shell was erected at the site and partly filled with concrete in December, 1909. The superstructure was completed on February 20, 1913, and the permanent light and temporary fog signal were established on February 15, 1913. The station is now completed, excepting the installation of the permanent fog signal, which work is now in progress and will be completed in the fall of 1913. Amount expended to June 30, 1913, $94,475.21.

Joe Flogger Shoal, Del.—The act of June 20, 1906, authorized $75,000 for establishing a light and fog signal at or near this shoal. The act of June 30, 1906, appropriated $40,000 for this purpose, and the act of June 17, 1910, increased the limit of cost for this light and fog signal to $105,000. An additional appropriation has not yet been made. Work on this project has been deferred, as the total amount necessary has not been appropriated and other projects are considered of greater importance. The shoal is now marked by a gas buoy. Amount expended to June 30, 1913, $603.21.

Brandywine Shoal, Del.—The act of March 4, 1911, appropriated $75,000 for rebuilding and improving the present light and fog signal at Brandywine Shoal, Delaware Bay, Del., on the present or an adjacent site. Contract has been entered into for a reenforced concrete lighthouse. Probable date of completion, June, 1914. Amount expended to June 30, 1913, $1,097.02.

FIFTH DISTRICT.

Thimble Shoal, Va.—The act of June 25, 1910, appropriated $68,000, and the act of August 26, 1912, $39,000 for the reestablishment of the light and fog signal station at this point. Contracts have been awarded for furnishing the metal work for a heavy cast-iron caisson structure and for erecting the same at the site. It is expected that the station will be completed by October, 1914. Amount expended to June 30, 1913, $9,112.61.

Fort McHenry Channel, Md.—The act of March 4, 1911, appropriated $125,000 for range lights in the Fort McHenry Channel, Md. Authority was given by Congress on July 27, 1912, for the use of this appropriation for the establishment of gas buoys and other aids to navigation in the channels leading to Baltimore. Five of the gas buoys have been received, and contract has been awarded for a skeleton steel tower to be erected at Fort McHenry. It is planned to have a complete system of gas buoys in the channels with a flashing acetylene light and electrically operated fog bell at Fort McHenry. It is expected to complete the work during November, 1913. Amount expended to June 30, 1913, $75.88.

Norfolk Harbor, Va.—The act of March 4, 1911, appropriated $35,000 for establishing an adequate system of lighting in the channels leading to Norfolk Harbor, Va. The channel is now lighted with gas buoys, and a light vessel displaying electric light has been established on Bush Bluff Station. Seven additional gas buoys will probably be established in the fall of 1913. Amount expended to June 30, 1913, $1,883.

SIXTH DISTRICT.

Cape Fear River, N. C.—The act of March 4, 1911, appropriated $21,000, and the act of August 26, 1912, appropriated $30,000 for lights and signals in Cape Fear River below Wilmington, N. C. Ten four-pile reenforced concrete structures with pipe towers were erected and lights established December 2, 1912. A contract has been made for

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20 similar structures on four piles and two pipe towers on concrete piers on land. Thirty-five per cent of the work on this contract had been completed on June 30, 1913. Probable date of completion and lighting late fall of 1913. Amount expended under both appropriations to June 30, 1913, $24,162.34.

EIGHTH DISTRICT.

Galveston Jetty, Tex.—The act of June 11, 1896, appropriated $35,000, and the act of May 27, 1908, $10,000 for establishing a light and fog signal at or near the outer end of one of the jetties at Galveston Harbor, Tex., and for changing the characteristic of Bolivar Point Light at the entrance to said harbor. On June 30, 1913, nine iron foundation piles had been driven, the iron work for the substructure was on hand, and a temporary light had been established. Detail plans for a reenforced concrete and structural steel superstructure were being prepared. Probable date of completion summer of 1914. Amount expended to June 30, 1913, $28,577.24.

Sabine Pass Jetty, Tex.—The act of May 27, 1908, appropriated $40,000 for a light and fog signal at or near the end of Sabine Pass Jetty. Nothing has been done on the work, in view of the proposed project of the War Department to extend the jetties to the 25-foot contour, a distance of possibly 2 miles. At the close of the fiscal year 1913 no money had been expended or obligated.

Sand Island Light Station, Ala.—The act of March 4, 1911, appropriated $15,000 for protecting the site of Sand Island Light Station, Ala. Contract was made for placing 1,800 tons of rock on and around the tower. The exposed location of this station makes the placing of rock impracticable except during most favorable weather. Probable date of completion fall of 1913. Amount expended to June 30, 1913, $550.98.

NINTH DISTRICT.

San Juan, P. R.—The act of May 27, 1908, appropriated $15,000 for a storehouse and dock at San Juan, P. R. The work was deferred for several years pending transfer of the depot and congressional authority to use the unexpended balance of the appropriation, $14,936, for the alteration, repair, and construction of necessary buildings and docks and improvements of the grounds of the reservation at San Juan, P. R., set aside to the Department of Commerce as a lighthouse depot and headquarters of the lighthouse district by the proclamation of the President dated January 26, 1912, which authority was given on July 27, 1912. During the year alterations and repairs were made to the various buildings on a part of the old naval reservation, a fence was erected around the reservation, and one of the buildings was fitted as quarters for the depot keeper. Probable date of completion late fall of 1913. Amount expended to June 30, 1913, $3,575.99.

TENTH DISTRICT.

Buffalo Breakwater, N. Y.—The act of March 4, 1911, appropriated $60,000 for rebuilding the Buffalo Breakwater North End Light Station, N. Y., on the present or an adjacent site. On June 30 the brickwork up to the top of second story was about completed, the fog-signal apparatus purchased, and the project about 60 per cent completed. Probable date of completion December 1, 1913. Amount expended to June 30, 1913, $16,790.79.

ELEVENTH DISTRICT.

Superior Entry, Wis.—The act of June 30, 1906, appropriated $20,000 for range lights at Superior Pierhead, Lake Superior, Wis. The act of March 4, 1911, appropriated $25,000 for completing the lighting of the breakwaters and piers at Superior Entry, Wis. Lights on the outer north breakwater and inner north pierhead were completed and established on October 10, 1912. The main light and fog signal on the south breakwater went into commission on June 30, 1913. The light on inner south pierhead is completed, but will not be put into commission until obstructions outside of it are removed by the United States Engineers. The need of an additional light under this project will be taken up when plans of the United States Engineers for dredging at inner entrance are definitely formed. Amount expended to June 30, 1913, $32,542.55.

Detroit River, Mich.—The act of March 4, 1911, appropriated $210,000 for establishing aids to navigation along the Livingstone Channel in the Detroit River, Mich., including authority to locate and construct lights and to place buoys necessary to properly mark this channel. On June 30, 10 permanent structures of concrete had been con-

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structed, 6 of which had been placed in commission, and 12 gas buoys and 21 spar buoys were established. Owing to United States Engineer plans for additional improvements in this channel, the probable date of completion of the project is not known. Amount expended to June 30, 1913, $84,622.44.

St. Marys River, Mich.—The act of August 26, 1912, appropriated $60,000 for repairs and improvements to aids to navigation along this river. The approved project embraces 43 lights, which are to be changed in illuminant from oil to Pintsch gas. Eight of the structures in the water will be capped with concrete on riprap stone and piles, while 10 will be thoroughly protected from ice by riprap stone. Four will be entirely rebuilt with steel, and concrete and new steel towers will be provided for two others. It is expected that all construction work will be completed during the present fiscal year. Amount expended to June 30, 1913, $654.46.

TWELFTH DISTRICT.

White Shoal, Mich.—The act of March 4, 1907, appropriated $250,000 for a light and fog signal station at White Shoal, north end of Lake Michigan, to replace the White Shoal Light Vessel, which was then located over these dangerous shoals. The light was placed in commission on September 1, 1910, and the fog signal on September 15, 1910. A submarine bell was established September 20, 1911. A water-supply system was completed in October, 1911. The oil-storage system was installed during June, 1913. The boat cranes are to be equipped with air-driven hoist, and additional riprap stone will be placed during the present fiscal year. Amount expended to June 30, 1913, $224,653.83.

SIXTEENTH DISTRICT.

Aids to navigation, Alaska.—The acts of March 4, 1909, and March 4, 1911, each appropriated $60,000 for establishing aids to navigation in Alaskan waters. During the year an expenditure of $30,702.74 was made from the latter appropriation, the former having been expended. Fifteen acetylene lights were established and three others changed from oil to acetylene, at a cost of $26,701.64. The material is on hand for the establishment of eight more. The total expenditure from the appropriation of March 4, 1911, to June 30, 1913, was $55,587.67, leaving a balance of $4,414.33 for future work.

Lincoln Rock, Alaska.—The act of March 4, 1911, appropriated $25,000 for rebuilding and improving the present light and fog signal at Lincoln Rock, Alaska, on the present or an adjacent site. The dwelling and fog-signal buildings were practically completed during the year. The acetylene light was temporarily installed in the old lantern on the rock. Work is about 90 per cent completed, and will be finished during the fall of 1913. Amount expended to June 30, 1913, $21,491.53.

NINETEENTH DISTRICT.

Kilauea, Kauai Island, Hawaii.—The act of May 27, 1908, appropriated $75,000 for a light and fog signal station at some point on the northerly or westerly coast of Kauai Island, Hawaii. On May 1, 1913, the light was put in operation, the station being 93 per cent completed. On June 30 the station was 98 per cent completed. The station comprises a reenforced concrete tower, with basement, supporting a first-order helical bar lantern and containing a second-order revolving lens and i. o. v. apparatus; reenforced concrete oil house; three dwellings, each containing six rooms and laundry; a power-operated steel boom derrick with landing platform; roadways; a 2-mile sanitary water supply pipe line with power operated pump and reenforced concrete tank for gravity distribution upon the reservation. Amount expended to June 30, 1913, $73,743.07.

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UNEXPENDED BALANCES ON JUNE 30, 1913, FROM APPROPRIATIONS FOR SPECIAL WORKS.

District.	Title of appropriation.	Acts.	Balance.
General	Tender for first lighthouse district	May 27, 1908; Mar. 4, 1909	$195,139.52
	Tender for fifteenth lighthouse district	Mar. 4, 1907	56,562.82
	Light vessels for general service	Aug. 24, 1912 Aug. 26, 1912	130,000.00 249,207.86
	Oil houses for light stations	Mar. 4, 1909; June 25, 1910	16,102.57
	Lightkeepers' dwellings	May 27, 1908	5,582.45
	Storehouses for oil	do	1,510.98
1st	Monhegan Island Fog Signal, Me	Mar. 4, 1911	1,938.93
3d	Staten Island and West Bank Light Station, N. Y.	June 30, 1906; Mar. 4, 1909	28,962.67
	Passaic Light Station, N. J	Mar. 4, 1907	14,343.25
	Tender for engineer, third lighthouse district	do	3,140.02
	Negro Point Light Station, N. Y	May 27, 1908	6,538.52
	Point Judith Lighted Buoy, R. I	do	2,736.97
	Point Judith Breakwater Lights, R. I	Mar. 4. 1909	2,452.84
	Repairs to lighthouse tender Pansy	do	11,688.07
	Staten Island lighthouse depot, N. Y	Mar. 4, 1911	11,710.76
	Stonington Light Station, Conn	do	492.27
	Rondout Creek Light Station, N. Y	do	40,000.00
	Hunts Point Light Station, N. Y	do	5,000.00
4th	Joe Flogger Shoal Light Station, Delaware River	June 30, 1906	39,396.79
	Miah Maull Shoal Light Station, Delaware River	June 30, 1906; Mar. 4, 1907; Mar. 4, 1911.	10,524.79
	Brandywine Shoal Light Station, Del	Mar. 4, 1911	73,902.98
	Edgemoor lighthouse depot, Del	do	31.57
5th	Chesapeake Bay lighted buoys	May 27, 1908	3,970.00
	Thimble Shoal Light Station, Va	June 25, 1910; Aug. 26, 1912	97,887.39
	Bogue Sound Range Light, Va	Mar. 4, 1911	234.31
	Fort McHenry Channel Range Lights, Md	do	124,924.12
	Lighting Norfolk Harbor, Va	do	33,117.00
6th	Tender for engineer, sixth lighthouse district	May 27, 1908	28,229.27
	Frying Pan Shoal Light Vessel, N. C	do	11,436.38
	Cape Fear River Lights, N. C	Mar. 4, 1911; Aug. 26, 1912	26,837.66
8th	Galveston Jetty Light Station, Tex	June 11, 1896; May 27, 1908	16,422.76
	Tender for inspector eighth lighthouse district	Mar. 4, 1907	7,408.46
	Sabine Pass Jetty Light Station, Tex	May 27, 1908	40,000.00
	Sand Island Light Station, Ala	Mar. 4, 1911	14,449.02
9th	San Juan lighthouse depot, P. R	May 27, 1908	11,424.01
10th	Buffalo Breakwater North End Light Station, N. Y.	Mar. 4, 1911	43,209.21
	Point Abino Light Vessel, Lake Erie	do	73,225.52
11th	Superior Pierhead Range Lights, Wis	June 30, 1906	12,457.45
	Detroit River Lights, Mich	Mar. 4, 1911	125,377.56
	Aids to navigation, St. Marys River, Mich	Aug. 26, 1912	59,345.54
12th	Relief light vessel, ninth and eleventh lighthouse districts.	Mar. 3, 1903; May 27, 1908	194.40
	Milwaukee Light Vessel, Wis	May 27, 1908	4,337.87
	North Point Light Station, Wis	Mar. 4, 1909	483.85
	White Shoal Light Station, Lake Michigan	Mar. 4, 1907	25,346.17
16th	Lincoln Rock Light Station, Alaska	Mar. 4, 1911	3,508.47
	Aids to navigation, Alaska	Mar. 4, 1909	4,414.33
17th	Battery Point Fog Signal, Wash	June 28, 1902	1,037.29
18th	San Pedro Breakwater Light Station, Cal	Mar. 4, 1911	774.42
	Point Loma Light Station, Cal	Aug. 26, 1912	377.45
19th	Kauai Island Light Station, Hawaii	May 27, 1908	1,256.93

BALANCES OF SPECIAL APPROPRIATIONS CARRIED TO THE SURPLUS FUND ON JUNE 30, 1913.

The following-named balances of special appropriations under the Lighthouse Service remaining on the books of the Treasury Department, and relating to works which had been completed and against which no obligations were known to exist were carried to the surplus fund on June 30, 1913:

Lloyd Harbor Light Station, N. Y	$7,708.31
Greenville Channel Lighted Buoy, N. J	9,000.00
Staten Island lighthouse depot, N. Y	3,750.12
Southwest Ledge Light Station, Conn	26,528.34
Eagle Point Range Lights, N. J	4.57
Lake Borgne Light Station, Miss	99.06
Cleveland Harbor Breakwater Light Station, Ohio	1,561.75
St. Marys River Range Lights, Mich	2,220.25

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Split Rock Light Station, Lake Superior	$2,622.54
St. Joseph lighthouse depot, Mich	5,354.03
Hinchinbrook Entrance Light Station, Alaska	24,689.10
Punta Gorda Light Station, Cal	635.31
Total carried to surplus fund	84,173.38

SAVING OF LIFE AND PROPERTY BY VESSELS OR EMPLOYEES OF THE LIGHTHOUSE SERVICE DURING THE FISCAL YEAR 1913.

District.	Vessel or employee rendering service.	Vessel, etc., aided.	Nature of assistance.
1st	Tender Hibiscus	Great Chebeague Island, Me.	Prevented bad forest fire.
	Eugene N. Larrabee, keeper, and Lennie Foster, first assistant keeper, of Petit Manan Light Station, Me.	Power yacht	Prevented yacht from drifting to sea in helpless condition; 6 persons on board.
	W. F. Lurvey, first assistant keeper, Mount Desert Light Station, Me.	Power boat (owner, Lafayette M. Carter).	Rescued man from disabled boat which had blown out to sea.
	Edward H. Pierce, keeper, Doubling Point Range Light Station, Me.	Power boat	Rendered assistance to party in disabled boat.
	J. H. Peasley, keeper, Crabtree Ledge Light Station, Me.	Arthur L. Bunker	Rendered assistance to man in danger of drowning.
	Lennie Foster, first assistant keeper, and A. J. Clinch, second assistant keeper, of Petit Manan Light Station, Me.	Power boat	Prevented disabled boat, with 2 men on board, from being blown out to sea.
	Tender Zizania	Sloop Mildred Goudy.	Towed dismasted sloop from dangerous position near the rocks at southwesterly end of Great Chebeague Island, Me., to wharf in Portland, Me.
	Tender Hibiscus	Schooner Harold C. Beecher.	Pulled schooner off a ledge, where she was pounding heavily, and towed her to harbor.
	Do	Schooner Colin C. Baker.	Beached disabled schooner on flats in Machias Bay, Me.
2d	Alfred A. Howard, keeper, Stage Harbor Light Station, Mass.		Towed disabled catboat to Hyannis, and took party of 5 ashore.
	Tender Mayflower	Launch EZ	Towed disabled launch, with 8 persons aboard, into Marblehead Harbor, Mass.
	Alfred A. Howard, keeper, Stage Harbor Light Station, Mass.		Rescued man from overturned dory and furnished him food.
3d	George Troy, keeper, Plum Beach Light Station, R. I.		Rescued 2 men from capsized canoe.
	Willis A. Green, keeper, Bridgeport Harbor Light Station, Conn.		Rescued 2 bathers from drowning.
	John H. Paul, keeper, Borden Flats Light Station, Mass.		Went to assistance of 2 men from capsized boat; saved 1.
	Edmund Ryder, keeper, Race Rock Light Station, N. Y.	Submarine mine boat from Fort H. G. Wright.	Rendered assistance to party in boat, engine being disabled.
	Do	Sailing yacht from Fishers Island.	Rendered assistance to party in yacht which was becalmed and could not stem tide.
	Officers and crew of Ambrose Channel Light Vessel No. 87, N. Y.	Motor boat Marinetto.	Boat disabled; 4 men taken on board light vessel.
	John R. Carlson, keeper, Bergen Point Light Station, N. J.		Went to rescue of 2 boys from overturned skiff, saving 1 of them.
	Cornelius Douglas, keeper, Sands Point Light Station, N. Y.		Rendered assistance to woman who had been shot on the lighthouse beach.
	Tender Gardenia	Launch Croton, water department, city of New York.	Towed boat to harbor, rudder being disabled.
	Frank M. Best, keeper, Hudson City Light Station, N. Y.	Steamer Isabella (Hudson-Catskill Line).	Took 11 women passengers off steamer, which had been collided with; ran lines to tug boats to pull vessel off bar.
	Jorg Samuelsen, quartermaster, and F. C. Gunderson, fireman, on tender Mistletoe.		Rescued man clinging to pile under wharf at Newport, R. I.
	Albert H. Porter, keeper, Dutch Island Light Station, R. I.	Motor boat Walter V. Kelly.	Boat disabled in gale. Brought owner and wife ashore and provided for them over night. Helped repair boat.

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Saving of life and property by vessels or employees of the Lighthouse Service during the fiscal year 1913—Continued.

District.	Vessel or employee rendering service.	Vessel, etc., aided.	Nature of assistance.
3d.....	Tender Gardenia.....	United States Engineer boat Manisees.	Pulled afloat from Rockaway Shoals.
	Tender Larkspur.....	.....	Pulled a horse out of East River.
	Employees of tenders at general depot.	.....	Rescued a man who fell overboard from Municipal Dock.
	C. W. Oliver, keeper, Great Captain Island Light Station, N. Y.	.....	Attempted to rescue a man from overturned boat.
	Joseph Smith, keeper, Duck Island Breakwater Lights, N. Y.	Schooner R. Bomers..	Notified wrecking company of stranding of schooner and ran lines from schooner to tow boats.
	Do.....	Tug Hockendagua and 4 barges in tow.	Hawser parted and barges grounded. Ran new hawser from tug to barges.
	Tender Larkspur.....	Launch of Romer Shoal Light Station, with keeper on board.	Launch out of gasoline; towed her to station.
	J. B. Murdock, keeper, Rondout Light Station, N. Y.	.....	Rendered assistance to 3 fishermen in distress.
	John Murphy, laborer in charge, Breaker Island, etc., Lights, N. Y.	.....	Rendered assistance to sufferers by floods in Hudson River.
	Charles W. Oliver, keeper, and Emil Usinger, assistant keeper, Great Captain Island Light Station, N. Y.	.....	Prevented boat with 2 men on board from drifting to sea, and supplied men with food.
	Wm. J. Murray, keeper, T. J. Conklin, first assistant keeper, and J. G. Collins, second assistant keeper, Little Gull Island Light Station, N. Y.	Schooner Pell.....	Schooner wrecked. Keepers saved much of cargo, and took master and crew ashore.
	Harry Crandall, assistant keeper, New Haven Light Station, Conn.	.....	2 men rescued from capsized boat taken to station and cared for 2 nights.
	Wm. L. Tutty, keeper, and Harry L. Crandall, assistant keeper, New Haven Light Station, Conn.	.....	Boat capsized; 2 men rescued from dangerous position and brought to station.
	Officers and crew of Ram Island Reef Light Vessel No. 23, N. Y.	.....	Saved man and son from sinking power boat.
	Geo. H Powell, laborer in charge Canarsie Dike, etc., Lights, N. Y.	.....	Saved man from drowning who had fallen overboard from launch.
	Arthur Jensen, keeper, Falkner Island Light Station, Conn.	.....	Took 12 people off motor boat Sols, which had run ashore, and cared for them overnight.
4th.....	William Spear, keeper, Deep Water Point Range Front Light Station, N. J.	Launch Avon (owner A. McDougall).	Launch driven ashore and disabled. Towed her to Wilmington, Del. Party on board consisted of 2 men, 2 children, and woman with baby.
5th.....	Tenders Jessamine and Juniper.	Schooner Alonzo Toulane.	Assisted schooner, which was in sinking condition.
	Thomas D. Quidley, assistant keeper, Neuse River Light Station, N. C.	Schooner Mariah.....	Schooner disabled. Rendered assistance to party on board.
	W. A. Crockett, first assistant keeper, and Miles Hudgins, second assistant keeper, Smith Point Light Station, Va.	.....	Saved 2 men from wreck of bateau Rhode M. Parkes.
	Lenox Cruk, master, tender Jessamine.	Bugeye Lillian White.	Rendered assistance when found in distress.
	C. W. Pugh, keeper, Roanoke Marshes Light Station, N. C.	Yacht Captain Lew H.	Piloted disabled yacht into harbor.
	Tender Juniper.....	Gasoline schooner Velma Brooks.	Rendered assistance to disabled schooner.
	Henry C. Wingate, keeper, Piney Point Light Station, Md.	Schooner David P. Mulford.	Rendered assistance to schooner which had run aground.
	R. H. Bertram, master, and Bruno Heinrich, fireman, Cape Lookout Shoals Light Vessel No. 80, N. C.	.....	Took crew off wrecked schooner J. Manchester Haynes, and furnished them provisions; placed lights on wreck in heavy sea.
	Charles H. Pertner, mate, and John T. Tolson, seaman, Bush Bluff Light Vessel No. 2, Va.	.....	Rescued party of 7 men from drowning who had abandoned a burning launch about midnight.
	Wm. H. Davis, keeper. Lazaretto Point Lighthouse Depot, Md.	Lazaretto Point Lighthouse Depot.	Prevented spread of a fire to the depot.

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Saving of life and property by vessels or employees of the Lighthouse Service during the fiscal year 1915—Continued.

District.	Vessel or employee rendering service.	Vessel, etc., aided.	Nature of assistance.
5th	Ernest C. Tull, first officer, tender Orchid.		Rescued one of crew who had been knocked overboard.
	Tender Maple	Schooner Orbit	Towed disabled schooner to harbor.
6th	Tender Cypress	German steamship Delta (Alvienkiel-Claussen Line).	Towed steamer, which was aground on bar in Sapelo Sound, to deep water.
	Tender Snowdrop		Rendered assistance to 3 men in sinking sloop John Martin and towed sloop to harbor.
	John Robertson, keeper, Little Cumberland Light Station, Ga.,		Saved an abandoned boathouse from fire.
	C. P. Honeywell, keeper, Cape Canaveral Light Station, Fla.		Brought the 6 survivors of the yacht Huntress to the light station.
	Jas. E. Swan, keeper, Mount Pleasant Range Lights, S. C.		Prevented spread of a fire to lighthouse property in the vicinity of light station.
	H. S. Svendsen, keeper, South Channel Range Light Station, S. C.		Brought a soldier who had been wounded as the result of the explosion of a gun at Fort Moultrie to Charleston, S. C., in the lighthouse launch.
	Thomas Knight, keeper, Hillsboro Inlet Light Station, Fla.		Brought the crew of the disabled schooner Alice Holbrook to the light station and kept them overnight.
7th	Tender Mangrove	British steamer Anteus.	Hauled steamer off French Reef, Fla.
	Do	Schooner Igo	Rendered assistance to crew of bilged schooner.
	E. J. Russell, keeper, H. M. Roberts, first assistant keeper; and C. Johnson, second assistant keeper, Dry Tortugas Light Station, Fla.		Brought captain and crew of the wrecked schooner Pendleton Bros. to the light station.
	R. S. Meyer, keeper, and C. H. Lopez, assistant keeper, Anclote Keys Light Station, Fla.		Assisted sick man from schooner Abbie Dodge to town to obtain medical attention.
8th	Joseph B. Brockenbrough, keeper, and Charles M. Teller, assistant keeper, Brazos River Light Station, Tex.		Rescued and assisted 3 of crew of burned U. S. Engineer dredge Comstock.
	Tender Sunflower	Steamship Parismina (owners, United Fruit Co.).	Assisted in floating ship which had grounded.
	Do	Steamship Mersario (owners, Maclay & McIntyre).	Floated ship which had grounded.
	John Asplund, keeper, Galveston Harbor Light Station, Tex.		Rescued 2 men from drowning who had been swimming and who, owing to high tide running out, were unable to return to their boat.
	Thomas P. Roberts, assistant keeper, Aransas Pass Light Station, Tex.		Secured a gas buoy which had gone adrift and conveyed it to safe place.
9th	Jose Veles, keeper, and Jose Carrero, assistant keeper, Point Borinquen Light Station, P.R.		Furnished provisions and assistance to 2 men from sloop San Miguel, who were swamped while landing and who had been without food for 2 days.
	Tender Ivy	Barkentine Ethel V. Boynton (owners, A. H. Bull Steamship Co.).	Towed the vessel from a dangerous position on Puntilla Reef, P. R., into safe water.
	Do	Schooner Henry O. Barrett.	Towed disabled vessel to anchorage.
	Do	Rowboat	Picked up adrift off Ponce, P. R.
10th	Robert Allen, keeper, Presque Isle Pierhead Light Station, Pa.		Rescued 2 persons who were about to drown while bathing in Lake Erie. (Life-saving medal awarded by Treasury Department.)
11th	Hans F. Christianson, second assistant keeper, Two Harbors Light Station, Minn.		Rendered assistance in rescuing 2 fishermen from drowning.
	Officers and crew of tender Amaranth, and Robert G. Hurst, foreman.		Prompt extinguishment of fire that broke out on tender.

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Saving of life and property by vessels or employees of the Lighthouse Service during the fiscal year 1915—Continued.

District.	Vessel or employee rendering service.	Vessel, etc., aided.	Nature of assistance.
11th	Tender Marigold	Derrick Boat No. 12 (owners, Great Lakes Dredge & Dock Co.).	During a heavy sea towed scow with 2 men on board to harbor, which had been abandoned by disabled tug.
12th	Frank A. Drew, keeper, and Geo. W. Drew, assistant keeper, of Green Island Light Station, Wis.		Rescued 2 men and 2 women, and went to assistance of 24 persons on gasoline boat Neptune, which was in serious danger.
	Ross F. Wright, first assistant keeper of Manitowoc Light Station, Wis.		Rescued party of boys and girls adrift in launch Psyche on Lake Michigan; also towed disabled motor boat of Two Rivers Life Saving Station into port.
	Henry R. Bevry, keeper; Alfred L. Cornell, first assistant keeper; Royal G. Petersen, second assistant keeper; and Peter Anderson, laborer, at Pilot Island Light Station, Wis.		Towed to light station motor boat carrying United States mail which had become frozen in ice 10 miles from the station; also rescued 3 men from rowboat who were in search of the mail boat. Reported that keepers were 72 hours without sleep or rest.
	Joseph Fountain, keeper, St. Helena Light Station, Mich.		Rescued and brought to light station 2 men who had become lost on the ice and were nearly frozen.
15th	Tender Oleander		Assistance rendered to many flood sufferers during overflow of Mississippi River.
16th	Wilfred Monette, first assistant keeper, and O. D. Holmes, second assistant keeper, Cape Sarichef Light Station, Alaska.		Rescued owner from capsized dory Maid of Orleans, and righted dory.
17th	W. J. Kenney, master, Michael O'Rourke, engineer, and Anders G. Berner, seaman, Columbia River Light Vessel No. 88, Oreg.		Brought to light vessel part of crew of steamship Daisy Freeman, which had stranded.
	Wm. Dahlgren, keeper; F. C. Hammond, second assistant keeper; Charles Miller, third assistant keeper; and Olaf Dahlin, fourth assistant keeper, Tillamook Rock Light Station, Oreg.		Kept light and fog signal in operation during a severe storm, notwithstanding great danger.
	Henry T. Williams, second assistant keeper, Grays Harbor Light Station, Wash.		Assisted life-saving crew in rescue of crew of British bark Torrisdale.
	Tender Manzanita	Steamship Rosecrans (owners, Associated Oil Co.).	Vessel wrecked. Tender crossed very rough bar and stood by endeavoring to save lives of crew.
	Columbia River Light Vessel No. 88, Oreg.	do	Survivors of wreck and crew of Point Adams life-saving station took refuge on light vessel and were cared for until weather permitted their reaching land.
	Tender Manzanita	Steamship Chanslor, (owners, Associated Oil Co.).	Steamer grounded. Tender attempted to pull her off.
	John M. Cowan, keeper; Shirley Cowan, second assistant keeper; and James E. Shaw, third assistant keeper, Cape Flattery Light Station, Wash.		Brought 2 men in a dory to light station, a distance of about 10 miles, who had left a burning gasoline launch.
18th	James Rankin, keeper, Fort Point Light Station, Cal.		Swam with a rope to the rescue of 2 men from capsized boat.
	Malcolm Cady, assistant keeper, Point Loma Light Station, Cal.		Rescued injured man who was in danger of being drowned.
	Tender Sequoia	Steamer Point Arena, (owners, A. W. Beadle Co.).	Towed disabled steamer from Bonita Point, Cal., to San Francisco water front.

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DAMAGE BY COLLISIONS.

The following is a list of the more important collisions affecting the property of the Lighthouse Service which occurred during the fiscal year 1913:

On October 9, 1912, Cross Rip Light Vessel *No. 5*, Mass., was run into by the schooner *Eagle Wing*. Repairs costing $150.90 were made by the owners of the schooner.

On November 9, 1912, Squam River Beacons 5 and 8 were demolished by tow of the tug *Undine*. The beacons were replaced by the owners of the tug.

On December 18, 1912, Vineyard Sound Light Vessel *No. 90*, Mass., was collided with by the schooner *Oliver Ames*. Efforts are being made to have the owners of the schooner pay the cost of repairs, $300.

On January 22, 1913, Peaked Hill Bar Gas and Whistling Buoy, 2, was run down by an unidentified vessel. Repairs were made by the Government at a cost of $435.

On February 21, 1913, Relief Light Vessel *No. 66*, on Pollock Rip Station, Mass., was run into by the schooner *Charles A. Campbell*. Repairs costing $125 were made by the owners of the schooner.

On March 3, 1913, Stone Horse Shoal North End Gas Buoy, 5A, was run down by a barge in tow of the tug *Asher J. Hudson*. Efforts are being made to recover the cost of repairs, $158, from the owners of the tug.

On March 8, 1913, Broad Sound Channel Gas Buoy, 6, Mass., was run down by a barge in tow of the tug *Channing*. Efforts are being made to recover the cost of repairs, $205, from the owners of the tug.

On March 26, 1913, Gedney Channel Entrance Buoy was run over by some unknown vessel. Repairs amounting to about $400 were borne by the Government.

On July 27, 1912, Sheepshead Bay Inner Light, N. Y., was carried away by the steamer *Evelyn*. The structure was rebuilt by the owner of the steamer.

On October 12, 1912, the tug *Comet*, with four barges in tow, injured Lower Light at Mouse Island. The light was reestablished by the owners of the tug.

On February 4, 1913, Cape Lookout Shoals Light Vessel *No. 80*, N. C., and the barge *Antietam* collided in Baltimore Harbor, Md., both vessels being damaged.

On April 5 Thimble Shoal Channel Buoy No. 6, Va., was fouled by the tug *Cuba*. Efforts are being made to have owners of the tug assume the cost of repairs, $171.53.

On April 7, 1913, Tail of the Horseshoe Light Vessel *No. 46*, Va., was collided with by the yacht *Pilgrim*. Repairs costing $400 were assumed by the owner of the yacht.

On May 3, 1913, a gas buoy in the Elizabeth River, Va., was collided with by the tug *Parksley*. Repairs costing $165.50 were assumed by the owners of the tug.

On July 31, 1912, Wards Bank Range Front Light, Fla., was run into by the tug *Kate Cannon*. The light was repaired at the expense of the owners of the tug.

On February 3, 1913, the steamship *Viking* damaged Head of Passes West Jetty Light, La. Repairs costing $270.89 were made at the expense of the owners of the steamship.

On April 8, 1913, Galveston Bay Channel Light No. 1, Tex., was collided with by the tug *Juno*. Repairs estimated at $1,500 were assumed by the owners of the tug.

On September 9, 1912, the tender *Crocus* collided with the lighthouse crib at Huron Harbor, Ohio, and was slightly damaged. Repairs were made at a cost of $175.

On August 15, 1912, West Neebish Channel East Side Upper Light No. 6, Mich., was run into and entirely demolished by the steamer *Steel King*. The structure was rebuilt by the owners of the vessel at a cost of about $1,200. On June 9, 1913, this light was again destroyed, by the barge *Magnetic*, and was rebuilt at the expense of the owners of the barge at a cost of about $1,200.

On June 11, 1913, Head of Shoals Gas Buoy No. 9, Mich., was run into by the tug *Annie Moyles*. The cost of repairs, about $1,600, was assumed by the owners of the tug.

On January 11, 1913, a switch engine of the Michigan Central Railway ran into the siding of the lighthouse depot at Detroit, Mich., and left the track, damaging several boats and other property, amounting to about $350. Efforts are being made to recover the cost of repairs from the railroad company.

On May 7, 1913, the tender *Aspen*, while lying at dock, was collided with by the steamer *F. M. Osborne*. Repairs, costing about $300, have been assumed by the owners of the steamer.

On May 29, 1913, the steamer *Tom Adams* and the tender *Amaranth* collided in St. Clair Flats Canal, Mich. The responsibility for the accident has been placed on the steamer *Tom Adams*. The *Amaranth* was damaged to the extent of about $300, and efforts are being made to have the owners of the steamer assume the cost of repairs.

On April 19, 1913, owing to negligent handling of the Madison Street Bridge, Chicago, Ill., the tender *Sumac* was damaged in the amount of $441. Efforts are being made to have the City of Chicago assume the cost of repairs.

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On September 12, 1912, Spike Rock Light, Alaska, was entirely destroyed, evidently by a boom of logs, and was replaced by the Government. Value of damage to the light, $300.

On December 9, 1912, the tender *Sequoia* was collided with by the steamer *Tallac*. Repairs, costing $126.50, were paid for by the owners of the steamer.

On November 12, 1912, Channel Gas Buoy, 9, Hawaii, was run into by the schooner *Sophie Christenson*. Repairs to the buoy were made by the agents for the vessel.

On November 12, 1912, Honolulu Harbor Light Station wharf, Hawaii, was run into by the schooner *Sophie Christenson*. The damage was repaired by the owners of the vessel at a cost of $112.

On December 28, 1912, Honolulu Channel Light No. 5, Hawaii, was knocked down and destroyed by a mud scow in tow of the tug *Helen*. The owners of the tug assumed the cost of repairing the damage, $660.

The following damage was caused by a vessel doing work of the Lighthouse Service during the year:

On May 6, 1913, the United States Engineer steamer *Elinor*, in temporary use as a tender in the Lighthouse Service, with two barges in tow, in attempting to make the landing at Prescott, Wis., in a strong wind, swung one of the barges into a house boat owned by a private individual. The Lighthouse Service was responsible for the collision, and in accordance with section 4 of the act approved June 17, 1910 (36 Stats., 537), Congress was requested to make appropriation to reimburse the owner of the house boat in the sum of $22.50, the amount ascertained to be due the claimant, which appropriation was made after the close of the fiscal year.

NOTE.—The libel of the steamers *Alabama* and *Roanoke* for damage to lighthouse property, noted on pages 68 and 69 of the Bureau's annual report for 1912, has been dismissed, and repairs made at the expense of the Government.

PUBLICATIONS OF THE BUREAU OF LIGHTHOUSES.

[All publications are at present distributed free.]

Publication.	Date of last edition.	Cost of last edition.	Number distributed from Washington during the fiscal year 1913.
Light lists:			
Atlantic and Gulf coasts of United States	July 1, 1912	$4,693	9,725
Pacific coast of United States, etc.	Mar. 15, 1912	1,406	158
Great Lakes of United States and Canada	Oct. 1, 1912	2,579	3,165
Upper Mississippi River and tributaries	July 15, 1912	774	1,501
Ohio River and tributaries	June 1, 1912	434	972
Lower Mississippi River and tributaries	July 15, 1912	336	888
Buoy lists:			
First district	July 15, 1911	1,502	1,055
Second district	Aug. 31, 1911	1,107	689
Third district	Mar. 31, 1911	1,965	570
Fourth district	Mar. 15, 1911	428	306
Fifth district	Apr. 15, 1913	1,682	293
Sixth district	Oct. 1, 1911	848	396
Seventh district	May 15, 1911	609	164
Eighth district	Dec. 15, 1912	635	2,837
Ninth district	May 15, 1911	185	77
Tenth district	July 1, 1912	539	1,190
Eleventh district	Oct. 1, 1912	752	547
Twelfth district	July 1, 1912	536	1,771
Sixteenth district	June 1, 1913	305	675
Seventeenth and eighteenth districts	July 1, 1911	1,193	293
Nineteenth district	July 31, 1911	225	1,025
Miscellaneous publications:			
Weekly notice to mariners	1913	[a]6,249	181,920
Annual report, Lighthouse Board	1907	2,369	1
Do	1908	1,818	9
Do	1909	1,897	54
Do	1910	361	228
Annual report, Commissioner of Lighthouses—			
Part I	1911	468	159
Part II	1911	680	1
Part I	1912	572	1,217
Part II	1912	322	113
Regulations for the United States Lighthouse Service	1911	745	53
Instructions to light keepers	1911	49	38
Instructions to officers of vessels	1911	33	16
Medical handbook	1912	440	76
Lighthouse Service bulletins	1912	[a]213	16,900
Regulations for lighting bridges	1912	163	708
Regulations for uniforms	1912	70	272
Civil service regulations	1913	73	383
Instructions for cost keeping	1912	9	1,022

[a] Total for the year.

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COST OF PRINTING FOR THE LIGHTHOUSE SERVICE DURING THE FISCAL YEAR 1913.

Light lists	$6,334	Specifications and other publications	$1,444
Buoy lists	4,874	Forms, reports, record books, etc.	7,141
Notices to mariners	6,249		
Annual report, Part I	572		
Annual report, Part II	322	Total	26,936

MONEY RECEIVED BY THE LIGHTHOUSE SERVICE AND TURNED INTO THE TREASURY, FISCAL YEAR 1913.

District.	From sales of vessels.	From sales of other property.	From damages to aids to navigation and other property.	From leases and rentals.
Bureau			$1.15	
2d		$3,735.80	35.95	$69.97
3d		6,832.81	1,028.84	150.00
4th				5.00
5th	$1,100.00	401.75		
6th		2,274.65	297.59	
7th				76.50
8th		1.00	1,297.95	16.00
10th		661.14	5.70	
11th		145.00	505.37	535.00
12th		211.65		
13th		40.85		
17th		28.40	300.00	165.00
18th		23.50		1,732.20
19th		272.90		

Total receipts, $21,951.67.

APPROPRIATIONS FOR THE BUREAU OF LIGHTHOUSES AND THE LIGHTHOUSE SERVICE, SIXTY-SECOND CONGRESS, THIRD SESSION, AND SIXTY-THIRD CONGRESS, FIRST SESSION, 1912–13.

[For appropriations made Aug. 23, 24, and 26, 1912, 62d Cong., 2d sess., see report for 1912, p. 70.]

Title.	Act.	Amount.
Maintenance:		
Salaries, Bureau of Lighthouses, 1914	Legislative, Mar. 4, 1913	$64,510
General expenses, Lighthouse Service, 1914	Sundry civil, June 23, 1913	2,750,000
Salaries of keepers of lighthouses, 1914	do	930,000
Salaries, lighthouse vessels, 1914	do	967,420
Salaries, Lighthouse Service, 1914	do	360,000
Total for maintenance		5,071,930
Special works:		
Depot for sixth lighthouse district	Deficiency, Oct. 22, 1913	125,000
Aids to navigation, Atchafalaya Entrance, La	do	50,000
Southwest Pass Light Vessel, Mississippi River, La	do	125,000
Navassa Island Light Station, West Indies	do	125,000
Aids to navigation, Ashtabula, Ohio	do	45,000
Aids to navigation, Lorain Harbor, Ohio	do	35,000
Cleveland fog-signal station, Ohio	do	17,600
Aids to navigation, Ashland, Wis	do	25,000
Aids to navigation, Manistique, Mich	do	20,000
Oconto Harbor Lights, Wis	do	5,000
Cape St. Elias Light Station, Alaska	do	115,000
Aids to navigation, Puget Sound, Wash	do	30,000
Warrior Rock Light Station, Oreg	do	2,000
Point Arena Light Station, Cal	do	3,000
Total for special works		722,600
Grand total		5,794,530

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EXPENDITURES DURING THE FISCAL YEAR 1913 FROM APPROPRIATIONS FOR THE LIGHTHOUSE SERVICE.

[Obligations incurred are not included.]

MAINTENANCE APPROPRIATIONS.

Salaries:	
Bureau of Lighthouses, 1912	$2,792.97
Bureau of Lighthouses, 1913	61,338.72
Repairs and incidental expenses of lighthouses:	
1911	12,295.73
Certified claims	3.17
Expenses of fog signals:	
1911	4,012.20
Certified claims	1,375.00
Supplies of lighthouses:	
1911	1,549.25
Certified claims	1,621.78
Salaries of keepers of lighthouses:	
1911	131.00
1912	49,058.89
1913	893,058.54
Certified claims	148.60
Expenses of light vessels:	
1911	6,950.91
Certified claims	842.35
Salaries, lighthouse vessels:	
1912	54,079.36
1913	912,520.52
Expenses of buoyage:	
1911	7,396.36
Certified claims	687.23
Lighting of rivers:	
1911	1,009.30
Repairs to lighthouse tenders, 1911	4,052.74
Repairs of light vessels, 1911	1,952.97
Maintenance of lighthouse tenders, 1911	554.16
Salaries Lighthouse Service:	
1912	18,275,31
1913	449,082.44
General expenses, Lighthouse Service:	
1912	500,910.48
1913	2,044,617.98
Total, maintenance	5,030,317.96

SPECIAL WORKS.

General:	
Tender for first lighthouse district	489.24
Tender for fifteenth lighthouse district	219.50
Light vessels for general service	2,592.14
Oil houses for light stations	7,459.91
Storehouses for oil	1,398.37
Light keepers' dwellings	6,932.19
Relief of employees of the Lighthouse Service	8,750.00
Claims for damages by collision with lighthouse vessels	193.00
First district:	
Monhegan Island Light Station, Me	5,603.27
Third district:	
Tender for engineer, third lighthouse district	12,334.75
Staten Island and West Bank, N. Y	3,407.25
Staten Island lighthouse depot, N. Y. (power plant)	10,344.49
Staten Island lighthouse depot, N. Y. (wharves)	29,203.30
Lloyd Harbor Light Station, N. Y	2,188.31
Point Judith Breakwater Lights, R. I	1,522.02
Negro Point Light Station, N. Y	2,262.43

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Third district—Continued.	
Ambrose Channel Buoys, N. Y.	$50.00
Point Judith Lighted Buoy, R. I.	1,201.03
Repairs to Lighthouse tender *Pansy*	311.93
Fourth district:	
Edgemoor lighthouse depot, Del.	19,956.13
Miah Maull Shoal Light Station, Delaware River	23,560.35
Brandywine Shoal Light Station, Del.	106.41
Eagle Point Range Lights, N. J.	292.13
Fifth district:	
Thimble Shoal Light Station, Va.	7,448.83
Bogue Sound Range Lights, N. C.	239.84
Lighting Norfolk Harbor, Va.	1,883.00
Sixth district:	
Cape Fear River Range Lights, N. C.	17,454.54
Frying Pan Shoal Light Vessel, N. C.	1,038.92
Tender for engineer, sixth lighthouse district	1,125.92
Eighth district:	
Tender for inspector, eighth lighthouse district	316.00
Sand Island Light Station, Ala.	550.98
Ninth district:	
San Juan lighthouse depot, P. R.	3,511.99
Tenth district:	
Buffalo Breakwater Light Station, N. Y.	16,379.92
Point Abino Light Vessel, Lake Erie	382.31
Eleventh district:	
Aids to navigation, St. Marys River, Mich.	654.46
St. Marys River Range Lights, Mich.	1.50
Detroit River Lights, Mich.	24,375.48
Superior Pierhead Range Lights, Wis.	19,427.45
Twelfth district:	
Relief Light Vessel ninth and eleventh lighthouse districts	13,941.93
Milwaukee Light Vessel, Wis.	18,571.01
White Shoal Light Station, Lake Michigan	1,254.27
North Point Light Station, Wis.	9,515.68
Sixteenth district:	
Aids to navigation, Alaska	30,732.14
Lincoln Rock Light Station, Alaska	12,845.28
Seventeenth district:	
Battery Point Fog Signal, Wash.	24,781.16
Reimbursement to officers and crew of tender *Manzanita*	1,635.55
Eighteenth district:	
Point Loma Light Station, Cal.	17,122.55
Punta Gorda Fog Signal, Cal.	444.03
San Pedro Breakwater Light Station, Cal.	31,572.53
Nineteenth district:	
Makapuu Point Light Station, Hawaii	4,064.33
Kauai Island Light Station, Hawaii	67,437.18
Total, special works	469,086.93
Total, maintenance appropriations	5,030,317.96
Total, special works	469,086.93
Grand total	5,499,404.89

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ITEMIZED ESTIMATES OF APPROPRIATIONS FOR THE FISCAL YEAR 1915, AND ITEMIZED STATEMENT OF EXPENDITURES FOR THE FISCAL YEAR 1913, AS REQUIRED BY THE ACT OF CONGRESS APPROVED JUNE 25, 1910 (36 STAT., 755).

[The expenditures herein stated are in part estimated, owing to the fact that all obligations incurred for the year 1913 have not yet been settled. Articles of supplies purchased for general stock have also been distributed, approximately, to features to be benefited. This table refers to appropriations made in the sundry civil appropriation act, and does not include Bureau salaries in Washington nor the cost of publications, otherwise provided for.]

Items	Estimate, 1915.	Expenditures, 1913.
GENERAL EXPENSES, LIGHTHOUSE SERVICE.		
Lights and fog signals:		
Rations and provisions	$160,000	$158,488
Fuel and rent for keepers	50,000	51,815
General supplies	175,000	188,699
Repairs and improvements, including grounds and outbuildings	400,000	327,852
Establishing lights and fog signals, including sites	100,000	45,295
Necessary additional land for light stations	3,000	.....
Oil and carbide houses	2,000	4,199
Incidental expenses	10,000	9,520
Daymarks and spindles:		
Establishment, including sites	3,000	4,051
Repairs and improvements	14,800	9,622
Incidental expenses	200	193
Post lights:		
Establishment	10,000	9,383
Wages of laborers attending lights	220,000	211,929
Supplies	20,000	19,507
Repairs and improvements	25,000	23,545
Incidental expenses	3,000	1,260
Buoys:		
Establishment	210,000	100,510
Supplies	81,500	82,776
Repairs	50,000	50,596
Incidental expenses	500	405
Tenders:		
Rations and provisions	205,000	201,482
Supplies	320,000	356,741
Repairs	200,000	175,599
Incidental expenses	10,000	10,868
Light vessels:		
Rations and provisions	84,000	81,751
Supplies	120,000	116,291
Repairs	147,000	161,160
Incidental expenses	3,000	2,795
Depots:		
Pay of laborers and mechanics	65,000	40,114
Rent	7,000	6,730
Depots—Continued.		
Repairs and improvements	$70,000	$69,835
Incidental expenses	3,000	2,286
Offices:		
Technical books and periodicals	800	918
Stationery and office supplies	12,200	13,508
Telegraph and telephone	7,000	6,762
Traveling expenses and mileage	20,000	20,312
Rent	6,000	5,647
Freight, expressage, and cartage	25,000	24,298
Incidental expenses	2,000	2,112
Total	2,845,000	2,598,854
SALARIES OF KEEPERS OF LIGHTHOUSES.		
Salaries of lighthouse keepers	940,000	910,137
SALARIES, LIGHTHOUSE VESSELS.		
Salaries and wages, lighthouse tenders	674,000	599,097
Salaries and wages, light vessels	364,000	333,392
Total	1,038,000	932,489
SALARIES, LIGHTHOUSE SERVICE.		
Salaries, executive and technical	145,000	132,494
Salaries, clerical and messenger	140,000	130,180
Salaries, authorized depot force	100,000	195,385
Total	385,000	458,059

SUMMARY OF ESTIMATES OF APPROPRIATIONS FOR THE LIGHTHOUSE SERVICE FOR THE FISCAL YEAR 1915.

FOR GENERAL MAINTENANCE OF THE LIGHTHOUSE SERVICE.

Salaries, Bureau of Lighthouses	$64,030
General expenses, Lighthouse Service	2,845,000
Salaries, Lighthouse Service	385,000
Salaries, keepers of lighthouses	940,000
Salaries, lighthouse vessels	1,038,000
Total	5,272,030

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FOR SPECIAL WORKS.

Works authorized by Congress for which no appropriations have been made:	
1. Carpenter shop, general lighthouse depot, Tompkinsville, N. Y., erection	$23,000
2. Monhegan Island, Me., construction and equipment of light vessel	125,000
3. Guantanamo, Cuba, building keepers' dwelling and improving the lighting	14,000
Total	162,000
Group 1. Works urgently necessary for the safety of navigation and for the preservation of existing structures or equipment, for the full utilization of other public improvements, or for the completion of projects already commenced:	
1. Lighthouse tender, general service, construction and equipment	325,000
2. Point Vincente, Cal., establishment of light and fog signal station	80,000
3. Florida Reefs, Fla., aids to navigation	75,000
4. Hudson River, N. Y., aids to navigation	85,000
5. Mississippi River, La., aids to navigation	50,000
6. Conneaut, Ohio, light and fog signal, and improving present aids to navigation	63,500
7. Kellett Bluff, Wash., establishment of light and fog signal station	40,000
8. St. Johns River, Fla., aids to navigation	66,000
9. Woods Hole, Mass., improvements to lighthouse depot	50,000
10. Fighting Island Channel, Mich., aids to navigation	25,000
11. Coquille River, Oreg., aids to navigation	4,000
12. Manhattan, Ohio, improving range lights	15,000
13. Pearl Harbor, Hawaii, aids to navigation	80,000
14. Alaska, aids to navigation	60,000
15. Dog Island, Me., establishment of light	3,500
16. Lighthouse tenders, general service, use of appropriation for tender for first district and elsewhere, for construction of two or more tenders for general service	
Total, group 1	1,022,000
Group 2. Works considered essential for the immediate needs of navigation and for the efficient equipment of the Lighthouse Service:	
17. Detroit, Mich., improvements to lighthouse depot	29,000
18. Staten Island lighthouse depot, N. Y., improvement	21,000
19. Tender and barge for eighth lighthouse district, construction and equipment	17,000
20. Huron Harbor, Ohio, aids to navigation	4,500
21. Honolulu lighthouse depot, Hawaii, construction and equipment	90,000
22. Point Borinquen Light Station, P. R., removal and rebuilding	85,000
23. Light keepers' dwellings, construction	75,000
24. Fairport, Ohio, aids to navigation	30,000
25. Sand Hills, Mich., establishment of light and fog signal station	75,000
26. Manitowoc Breakwater Light Station, Wis., improvement	25,000
Total, group 2	451,500
Group 3. Works considered essential for the needs of navigation and the equipment of the Lighthouse Service, and which it is recommended be undertaken as resources permit, are submitted with estimates of cost. (These items have been selected from a much larger number of recommendations submitted by the inspectors of the lighthouse districts and others.)	
27. Tampa Bay, Fla., aids to navigation	12,000
28. Sturgeon Bay, Wis., aids to navigation	12,100
29. Keweenaw Waterway, Mich., aids to navigation	110,000
30. Milwaukee, Wis., lighthouse depot, purchase of site and construction and equipment	200,000
31. Alaska, lighthouse depot, purchase of site and construction and equipment	40,000
32. Point Pinos Light Station, Cal., improvement	29,000

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Group 3—Continued.	
33. Kauhola Point Light Station, Hawaii, improvement	$15,000
34. Goat Island lighthouse depot, Cal., improvements	43,000
35. Santa Barbara Light Station, Cal., improvements	29,000
36. Hilo, Hawaii, aids to navigation	19,000
37. Portage Lake, Mich., establishment of light and fog signal station and improvement of aids	100,000
38. Ram Island, Me., establishment of light	3,100
39. Cape Kumukahi, Hawaii, establishment of light	24,000
40. Henderson Point, Me., establishment of light and fog signal	3,800
41. Port Real, P. R., establishment of light station	34,000
42. Nine-Mile Point, Mich., establishment of light and fog signal station	50,000
43. Ludington, Mich., establishment of light and fog signal station	61,000
Total, group 3 (not included in total of estimates)	785,000

RECAPITULATION.

For general maintenance of the Lighthouse Service		5,272,030
For special works:		
For works authorized	$162,000	
Group 1	1,022,000	
Group 2	451,500	
		1,635,500
Grand total		6,907,530

DETAILED ESTIMATES FOR MAINTENANCE, 1915.

BUREAU OF LIGHTHOUSES.

Salaries $64,030

GENERAL EXPENSES, LIGHTHOUSE SERVICE.

For supplies, repairs, maintenance, and incidental expenses of lighthouses and other lights, beacons, buoyage, fog signals, lighting of rivers heretofore authorized to be lighted, light vessels, other aids to navigation, and lighthouse tenders, including the establishment, repair, and improvement of beacons and daymarks and purchase of land for same; the establishment of post lights, buoys, submarine signals, and fog signals; the establishment of oil or carbide houses not to exceed $10,000: *Provided*, That no oil or carbide house erected hereunder shall exceed $550 in cost; the construction of necessary outbuildings at a cost not exceeding $200 at any one light station in any fiscal year; the improvements of grounds and buildings connected with light stations and depots; wages of laborers attending post lights; pay of temporary employees and field force while engaged on works of general repair and maintenance and pay of laborers and mechanics at lighthouse depots; rations and provisions or commutation thereof for keepers of lighthouses, officers and crews of light vessels and tenders, and officials and other authorized persons of the Lighthouse Service on duty on board of such tenders or vessels; and money accruing from commutation for rations and provisions for the above-named persons on board of tenders and light vessels may be paid on proper vouchers to the person having charge of the mess of such vessels; reimbursement under rules prescribed by the Secretary of Commerce of keepers of light stations and masters of light vessels and of lighthouse tenders for rations and provisions and clothing furnished shipwrecked persons who may be temporarily provided for by them, not exceeding in all $5,000 in any fiscal year; fuel and rent of quarters where necessary for keepers of lighthouses; the purchase of land sites for fog signals, and necessary additional land for light stations and depots under rules prescribed by the Secretary of Commerce: *Provided*, That no single acquisition of such additional land shall cost in excess of $500; the rent of necessary ground for all such lights and beacons as are for temporary use or to mark changeable channels and which in consequence can not be made permanent; the rent of offices, depots, and wharves; traveling expenses, including per diem in lieu of subsistence, under rules prescribed by the Secretary of Commerce,

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at not to exceed $4 per day; and mileage, library books for light stations and vessels, and technical books and periodicals not exceeding $1,000; and for all other contingent expenses of district offices and depots and for contingent expenses of the Office of the Bureau of Lighthouses in Washington, $2,845,000. Hereafter employees of the Lighthouse Service compensated at a per diem rate of pay may be granted 15 working days' leave of absence each year without forfeiture of pay during such absence, under rules prescribed by the Secretary of Commerce: *Provided*, That no employee of the class herein mentioned shall be entitled to any leave until he has served 12 consecutive months, when he may be granted 15 days' leave, and that during the second or any subsequent year 15 days' leave at the rate of one and one-fourth days per month, as earned, may be granted from the beginning of the second service year: *Provided further*, That the inspectors of the several lighthouse districts shall have discretion as to the time when the leave can be allowed without detriment to the Service, and that absence on account of sickness shall be deducted from the leave hereby granted. Hereafter post-lantern lights and other aids to navigation may be established and maintained, in the discretion of the Commissioner of Lighthouses, out of the annual appropriations for the Lighthouse Service, on Lakes Okechobee and Hicpochee and connecting waterways across the State of Florida.

NOTE.—The amount estimated for is $95,000 in excess of the appropriation for the fiscal year 1914, consisting of the following items:

Installation of radio sets on lighthouse tenders	$20,000
Leave of absence for per diem employees	15,000
General increase of Service	75,000
Total	110,000
Transfer of salaries of permanent foremen to appropriation, "Salaries, Lighthouse Service"	15,000
Balance	95,000

The item of $20,000 for wireless installation on tenders is believed to be an urgent matter for the best efficiency of the Service, in order to permit of prompt communication of orders and information, thereby avoiding unnecessary steaming to points at which mail or telegraph facilities are at hand. It is also believed that these installations on Government vessels will be of general public benefit in the saving of life and property, or similar emergencies. It is proposed to proceed with these installations in a moderate manner from year to year at the rate of about five vessels annually, until all important seagoing tenders are so equipped.

The item of $15,000 for leave of absence of per diem employees is dependent on legislation recommended for that purpose. A bill (House bill 1780) to provide such legislation was introduced at the Sixty-third Congress, first session, but failed of passage. Legislation to this effect is recommended in the above estimate of appropriation. It is believed that the granting of this leave would be of benefit to both the employees and the Lighthouse Service, but in order that the work of the Service may not be delayed, it is necessary to provide funds to meet this expense.

The further increase of $75,000 is considered necessary on account of the increase in numbers of aids required for the safety of navigation and to keep the Lighthouse Service in an economical state of repair and efficiency. This increase of $75,000 is 2.7 per cent over the appropriation last year, while the total number of aids was increased during the fiscal year 1913 from 12,843 to 13,434, an increase of 591, or 4.6 per cent. In order to keep pace with the constant development of commerce it is believed that proper provision for maintenance and repair as well as for the establishment of necessary additional minor aids frequently requested by mariners should be made.

The item of $15,000, which it is desired to transfer to the appropriation, "Salaries, Lighthouse Service," arises from the fact that it is the object to include in the latter appropriation the salaries of those employees whose service is definite and continuous, it having been found in carrying out the legislation enacted last year that certain foremen heretofore classed as temporary employees have been continuously employed throughout the year, and should therefore be considered properly as part of the permanent force.

In connection with the estimate of appropriation submitted herewith, authority is requested to establish and maintain post lantern lights and other aids to navigation on Lakes Okechobee and Hicpochee and connecting waterways across the State of Florida. The lighting of rivers or inland waters is limited to those specifically authorized by Congress and such authority has not been granted for the waters herein specified. Petitions of maritime interests in these localities have urged the establishment of lights, and investigation by the Lighthouse Service has found the same to be warranted.

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It is further recommended that consideration be given to the consolidation of the four general maintenance appropriations under the single appropriation "General expenses," by naming in the consolidated general appropriation a specific amount as the limit of all salary items included therein. It is believed that this step would effect a more economical and efficient administration of the Lighthouse Service by simplification of the accounting system, and permitting the costs of work to be kept in a more systematic and comprehensive manner, showing clearly for each principal feature the relative amounts paid for salaries, materials, supplies, equipment, and other component items. Among additional advantages of consolidation of items of general appropriation may be stated the following: (*a*) Laborers in charge of lights are now paid out of two different appropriations, those attending lights on rivers authorized by Congress to be lighted being paid out of general expenses, and those at other lights not on rivers being paid out of salaries of keepers; (*b*) commutation of rations of keepers and other employees (which may be properly considered as part of their compensation) now must be paid out of the appropriation "General expenses," while the salaries proper are paid out of the respective salary appropriations; (*c*) the items recommended for consolidation have natural limitations. For example, the number and average salary of keepers is limited by law. A necessary limitation is also imposed by the number of vessels in service.

(See p. 387 for itemized estimate.)

SALARIES, KEEPERS OF LIGHTHOUSES.

For salaries of not exceeding 1,800 lighthouse and fog-signal keepers and laborers attending other lights, exclusive of post lights, $940,000.

NOTE.—Revised Statutes, section 4673, authorizes the regulation of salaries of lighthouse keepers, based upon an average of not exceeding $600 to each keeper. The above estimate is for approximately 1,775 keepers, at an average of $530, and provides for an increase of 50 positions, and an amount of $10,000 over the figures appropriated for the fiscal year 1914. There were 1,744 authorized positions on July 1, 1913, and it is believed the increase submitted will provide for the growth of the Service. The authorized maximum number of keepers in recent years is shown in the following list:

Act of March 3, 1901, 1,600 positions; act of June 28, 1902, 1,650 positions; act of March 4, 1909, 1,700 positions; act of June 25, 1910, 1,750 positions; submitted, 1,800 positions.

(See p. 387 for itemized estimate.)

SALARIES, LIGHTHOUSE VESSELS.

For salaries and wages of officers and crews of light vessels and lighthouse tenders, including temporary employment when necessary, $1,038,000.

NOTE.—The amount estimated for is $70,580 in excess of the appropriation for the fiscal year 1914, consisting of the following items:

Equalization of pay for crews of vessels	$40,400
Complements of new vessels	24,680
Wireless operators	5,500
Total	70,580

The item of $40,400 is occasioned on account of the difficulty experienced in obtaining and holding satisfactory seamen, firemen, and other employees of vessels; it is proposed to make the minimum pay $35 per month instead of $30 per month, to conform to general practice. About 670 employees, at an average increase of $60 per annum, will be affected by this change, which it is believed will materially improve conditions in the personnel of the vessels.

The item of $24,680 arises from the fact that two new tenders and three new light vessels are expected to go into commission during the fiscal year 1915, and complements based on those of similar classes should be provided for them.

The item of $5,500 for wireless operators is intended to provide for the additional employees required for proposed installations on lighthouse tenders, the necessity for which has been explained under the estimate "General expenses."

(See p. 387 for itemized estimate.)

SALARIES, LIGHTHOUSE SERVICE.

For salaries of 17 lighthouse inspectors, and of clerks and other authorized permanent employees in the district offices and depots of the Lighthouse Service exclusive of those regularly employed in the office of the Bureau of Lighthouses, Washington, D. C., $385,000.

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Hereafter the annual salaries of lighthouse inspectors, including one inspector for the general service, and excepting the inspector of the third lighthouse district, shall not exceed $2,700 each.

NOTE.—An increase of $25,000 over the appropriation for the fiscal year 1914 is submitted consisting of the following:

Transfer of salaries of permanent foremen from appropriation general expenses	$15,000
Additional clerks and draftsmen	10,000
Total	25,000

The necessity for the first item of $15,000 is explained under the estimate, general expenses. About 10 positions at salaries averaging $125 per month will be affected by this transfer.

The item of $10,000 is occasioned by the general growth of the Service in order that the technical and clerical work of the district offices may be dispatched promptly. About 10 positions at salaries ranging from $900 to $1,500 per annum will be thus provided for.

The salaries of lighthouse inspectors are by the act of June 17, 1910 (36 Stat., 538), limited to $2,400 a year, except the inspector of the third district, whose salary is fixed at $3,600. The salary of $2,400 is inadequate, because of the heavy responsibilities with which the inspector is charged, and the technical and business ability required to successfully discharge the duties. The compensation of these positions should be sufficient to bring into and retain in the Lighthouse Service a class of persons fully competent to efficiently conduct such important work. The inspectors should be men of high character and qualifications including technical knowledge as to engineering and nautical affairs and should have business ability. The maximum total increase under this change is $4,800.

(See page 73 for itemized estimate.)

DETAILED ESTIMATES FOR SPECIAL WORKS, 1915.

Works authorized by Congress, for which no appropriations have been made:

No. 1. *Staten Island, N. Y., lighthouse depot.*—To erect a carpenter shop at the general lighthouse depot, Tompkinsville, Staten Island, N. Y. Act March 4, 1913, (37 Stat., 1017, sec. 1), $23,000.

NOTE.—The carpenter shop at this depot is an old wooden building, badly constructed, and is a menace in case of fire. It should be taken down and a new two-story fireproof building erected in its place, the upper floor to be used as carpenter shop and lower floor for mill and boat shop. Detailed estimate:

Removing old building and preparing site	$1,200
Foundation	900
Building	18,000
Reinstalling machinery	2,900
Total	23,000

No. 2. *Monhegan Island, Me., light vessel.*—To construct and equip a light vessel to be placed near Monhegan Island, entrance to Penobscot Bay, Me., $125,000.

NOTE.—This light vessel was authorized by the act of Congress approved March 4, 1913 (37 Stat., 1017).

No. 3. *Guantanamo, Cuba, aids to navigation.*—For dwelling for keepers of the lights in Guantanamo Bay, Cuba, and improving the lighting, $14,000.

NOTE.—The act of July 27, 1912 (37 Stats., 239), authorized the construction of these works, but no appropriation was made therefor. The dwelling at this station was destroyed during the late insurrection, and since the occupation of Guantanamo by the United States the keepers have been compelled to live in a wooden shack with only three rooms to house three keepers. The lights in charge of these three keepers are widely separated. With the installation of acetylene lights as proposed, the service of one keeper may be dispensed with. Detailed estimate:

Dwelling for two keepers	$8,000
2 acetylene lights at Fisherman Point	2,800
2 acetylene lights at Hicacal Beach	2,800
Contingencies	400
Total	14,000

GROUP No. 1.

Works urgently necessary for the safety of navigation and for the preservation of existing structures or equipment, for the full utilization of other public improvements, or for the completion of projects already commenced.

No. 1. *Lighthouse tender, general service.*—For constructing and equipping a lighthouse tender for general service, and the amount authorized for this purpose by the

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act approved March 4, 1913 (37 Stats., 1017), is hereby increased by the sum of $75,000, $325,000.

NOTE.—On May 20, 1912, the lighthouse tender *Armeria* struck a rock off Cape Hinchinbrook, Alaska, and was totally lost. This tender was the largest in the Lighthouse Service and the only one regularly assigned for service in Alaskan waters. The loss of this tender has seriously crippled the available tender force and a new tender should take its place as soon as possible. The lighthouse work is constantly increasing, on account of the increase of shipping and demand for aids to navigation. It is proposed to use the new tender for general lighthouse service as required and also for the purpose of transporting supplies to the Pribilof Islands in Bering Sea for use in the Alaska sealing industry and for use in Alaskan waters in connection with the work of other branches of the Government, as far as may be desirable and practicable. A large seaworthy vessel is essential for this work because the vessel must carry supplies to distant points and must be able to make voyages of considerable length across portions of the north Pacific Ocean. The vessel must be of slightly greater draft and carrying capacity than the tender *Armeria*, which was lost, in order to transport the necessary quantities of coal, supplies, and construction materials. It is important that the proposed vessel should be so designed as to be protected against loss.

For the past three years and also this year the Department has been compelled to charter an appropriate vessel to carry supplies to the Pribilof Islands for the use of the native inhabitants there who are wards of the Government, and bring back sealskins. The charter of a suitable vessel, exclusive of the coal used on the vessel, amounts to $150 a day, and including coal has caused an annual charge on appropriations of this Department of from $20,000 to $23,000 per annum.

If the lighthouse tender authorized to be constructed under the act of March 4, 1913, above referred to, can be enlarged so as to provide the cargo space necessary to carry the supplies, which enlargement can be made if the amount to be expended for the tender is increased by $75,000, that vessel could be used for the purpose of transporting the supplies to the islands at a considerable saving to the Government.

Calculating the increased cost of operating a larger vessel over the cost of operation of the vessel originally proposed to be constructed, which it is estimated will be about $7,000 per annum, there remains a net saving of approximately $13,000 per annum, or 17 per cent on the investment of $75,000 necessary to carry out this plan. However, the larger tender will not be used during the entire year, and probably a saving of $2,000 per annum will be made in operating costs during the time the tender is laid up during the winter months. This will increase the profit to the Government on the investment of the additional $75,000 to approximately 20 per cent. Since the Department has been administering the fur-seal service on the Pribilof Islands there has been but one vessel on the Pacific coast which was available for charter for the taking of supplies to the islands.

Should the vessel receive an annual charter or get a charter at more favorable terms during the time the Department would have to use it, difficulty might be experienced in engaging a suitable vessel, or the Department might be compelled to expend for charter a sum in excess of the amount which could be spared under the limited appropriations made for the Alaskan service.

Another very potent argument in favor of providing a governmental vessel for the purpose of transporting the supplies to the native inhabitants is that during the entire time the shipment of supplies and the return of the fur-sealskins would be under the direct control of the United States Government.

The vessel, if constructed now, would be able to take care of the growth in the Lighthouse Service for some years to come, and could render valuable service in connection with the work of this Department in Alaska, which necessarily will increase in volume for several years, especially under the closed requirements of the existing treaty referring to the fur-seal herds on the Pribilof Islands in Alaska.

Cost of charter of steamer *Homer* for use in transporting supplies to the fur-seal islands:

	Day rate.	Days.	Amount.
1910	$142.50	104½	$14,877.55
1911	142.50	117	16,567.75
1912	150.00	133	20,025.00

Detailed estimate: Navy tugs built on Pacific coast under 10-hour day cost $198.35 per ton, and two new revenue cutters built under 8-hour law cost $215.51 per ton. On account of the additional hull required for cargo space, without any appreciable increase in machinery, it is believed the cost of the proposed vessel may be estimated at $150 per ton. The maximum displacement of the *Armeria* was about 1,800 tons, which in the proposed vessel is to be increased to about 2,000 tons.

2,000 tons, at $150	$300,000
Wireless outfit	5,000
Machine-shop outfit	5,000
Derrick	9,000
Windlass	6,000
Total	325,000

The act of March 4, 1913 (Public, No. 453), authorized the construction of a tender for general service at $250,000, but a more seaworthy vessel with greater carrying capacity, as explained above, is now deemed necessary for the desired service. No appropriation for this object has as yet been made.

No. 2. *Point Vincente, Cal., Light Station.*—For establishing a light and fog signal station at Point Vincente, Cal., $80,000.

NOTE.—Point Vincente is the most prominent point of the California shore line between Point Loma and Point Conception, a distance of 220 nautical miles. Practically all steamer traffic on the Pacific coast south of San Francisco, both domestic and foreign, passes this point. Point Fermin Lighthouse, 6¼ miles to the southeastward, is cut off from steamers approaching on the usual courses from the northward until within 4 miles of Point Vincente, by that point itself. This leaves an unlighted gap of 32 nautical miles on the usual courses of coasting vessels between Point Hueneme Light Station and Point Fermin Light Station. Freight and passenger traffic is very heavy along this part of the coast and will be materially increased with the opening of the Panama Canal. Point Vincente is a bold, rocky point and practically no warning can be had by the lead in approaching it in foggy weather, as the 100-fathom curve lies within one-half mile of the shore. The importance of this point is increased by the fact that it is a point of change

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of course for all passing traffic. Petitions dated September 21, 1907, September 3, 1909, and October 28, 1909, signed by masters and shipowners, requested that a light and fog signal be established at this point. It is proposed to establish a flashing light at an elevation of 170 feet, and a first-class compressed-air fog signal. Detailed estimate:

Tower, including site and water supply	$31,000
Illuminating apparatus	5,500
Fog-signal apparatus and building	9,800
Dwellings for three keepers	19,000
Outbuildings, fences, oil storage, piping, etc	7,000
Contingencies	7,700
Total	80,000

No. 3. *Florida Reefs, Fla., aids to navigation.*—For establishing additional lighted aids for Florida Reefs, and repairs and improvements to existing aids, $75,000.

NOTE.—On account of the unusually difficult and dangerous conditions encountered by vessels navigating near the Florida Reefs, especially by vessels bound into the Gulf of Mexico, which pass close to the reef to avoid the adverse Gulf-stream current, additional lighted aids are urgently needed. A very large commerce is carried on through the Straits of Florida and numerous strandings and wrecks, involving large losses, have occurred in the past, several within the last year. These reefs, owing to their nature, are a grave danger to navigation. They rise steeply from the deep channel of the Straits of Florida and the lead is, therefore, of little assistance. They lie far from shore, and at night the mariner must rely almost entirely upon artificial aids to guide him clear. It is, therefore, proposed to provide four intermediate lighted aids to be located about midway between present lights, which it is believed would greatly decrease the present dangers of navigation in that vicinity. Detailed estimate:

Skeleton towers in place, Molasses Reef and Pacific Reef, with iron-pile foundations	$50,000
Illuminating apparatus for Molasses Reef and Pacific Reef	10,000
Gas buoys for Coffins Patches and Looe Key	10,000
Repairs and improvements to existing aids	5,000
Total	75,000

No. 4. *Hudson River, N. Y., aids to navigation.*—For improving the aids to navigation and establishing new aids on the Hudson River, N. Y., $85,000.

NOTE.—The lighting on the river is obsolete and many of the existing aids are in poor condition from age and so constructed that it is impossible to keep them in operation when the ice commences to move, and as navigation is frequently open for a month in fall of the year under these conditions, it is a great inconvenience and danger to navigation. Many complaints have been received from pilots and officials of Hudson River steamers, and correspondence with them has indicated a number of points at which improvements or new aids are considered necessary. With the large amount of traffic on this river and the size of passenger steamers navigating it at night, it is believed that a modern system of flashing lights, on concrete foundations so as to resist ice damage, would be of great assistance to navigation. It is proposed to improve existing aids at Staats Point, Lamphere Dock, Four Mile Point, West Flats and Con Hook, by providing brighter and flashing lights, to increase candlepower and provide fog bell at Jeffreys Hook, to rebuild decayed foundations and provide new towers and brighter lights at Bear Island, Cow Island, Nine Mile Tree, Roha Hook, Five Hook Island, New Baltimore, Fitch's Wharf, Percy Reach, Catskill West Flats, Livingston Creek, Upper Coal Beds, and Esopus Island, to rebuild tower and fog-bell house and improve the light at West Point, and to establish new lights at Van Wies Point, Barrytown Bluffs, Magazine Point, and Anthony's Nose, improving in all 19 existing lights and establishing 4 new lights. The cost of providing and moving suitable construction plant has also been included. Detailed estimate:

Improving Staats Point, etc., 5 lights, at $2,500	$12,500
Improving Jeffreys Hook with fog bell	5,500
Rebuilding and improving Bear Island, etc., 12 lights, at $3,000	36,000
Rebuilding and improving West Point	6,000
Establishing Van Wies Point, etc., 4 lights, at $4,000	16,000
Contingencies	9,000
Total	85,000

No. 5. *Mississippi River, La., aids to navigation.*—For improving the aids to navigation and establishing new aids on the Mississippi River, below New Orleans, La., $50,000.

NOTE.—It is proposed to establish about 22 acetylene lens-lantern lights on skeleton steel towers, to take the place of the inefficient oil post-lantern lights now shown from wooden posts. Vessels traverse the river drawing 28 feet of water. The commerce of the river is large and important. From January 1 to December 31, 1912, 3,195 coastwise and foreign-bound vessels, with a tonnage of approximately 6,700,000, entered the port of New Orleans. The imports and incoming coastwise shipments during 1912 were valued at approximately $94,000,000, and the exports and outgoing shipments approximately $206,000,000, making a total value of $300,000,000. Detailed estimate:

22 ramps and foundations	$12,000
22 steel towers, 30 feet high	9,000
22 illuminating outfits	25,000
Contingencies	4,000
Total	50,000

No. 6. *Conneaut, Ohio, aids to navigation.*—For a light and fog signal and improving the present aids to navigation in Conneaut Harbor, Ohio, $63,500.

NOTE.—Extensive improvements to enlarge this harbor, involving the construction of new breakwaters and pierheads, and the removal of the breakwater pierhead upon which the present Conneaut Harbor Front Range Light and Fog Signal is situated, have been authorized and the construction of the breakwaters is in progress. It is probable that the pierhead will be completed early next season. The harbor improve-

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ment will necessitate a rearrangement of the aids to navigation and it is proposed to build a suitable structure for the main light on the pierhead, the light to be an oil vapor flashing light and the present fog bell, which is inadequate, to be replaced with a modern compressed-air siren. The commerce of Conneaut Harbor is extensive. The annual number of vessels entering and departing is about 3,000, representing a total registered tonnage of approximately 9,000,000. Detailed estimate:

Concrete base	$20,000
Riprap	8,000
Superstructure	20,000
Illuminating apparatus	4,000
Fog-signal apparatus	8,000
Boats, piping, etc	3,500
Total	63,500

No. 7. *Kellett Bluff, Wash., Light Station.*—For establishing a light and fog signal station at or near Kellett Bluff, Henry Island, Wash., $40,000.

NOTE.—The greater part of the commerce between Puget Sound and Alaska, and between Cape Flattery and points on the Gulf of Georgia, will be benefited by the establishment of a light and fog signal station at this point. Vessels proceeding to the northward through Haro Strait in a fog keep close in to the west shore of San Juan Island, the water being deep, and judge of their position by the echo of the whistle from the precipitous shore of the island until they reach Mosquito Pass and Open Bay, where the uncertain currents are apt to cause them to lose their reckoning. Several large vessels have been ashore in the vicinity of Kellett Bluff and casualties have been avoided merely through fortunate circumstances attending the grounding of the vessels. Approaching Kellett Bluff from the northward it is important to the mariner that he verify his position in that vicinity in order to avoid the danger of running aground on the bluff, as well as to enable him to shape his course for proceeding to the southward. A flashing light and a reed-horn fog signal are recommended. There is a reservation of land for lighthouse purposes at Kellett Bluff. Detailed estimate:

Fog-signal building and tower	$12,000
Dwellings for two keepers	13,000
Illuminating apparatus	1,000
Fog-signal apparatus	4,000
One derrick and hoisting engine	1,000
Oil house, outbuildings, boats, walks, etc	5,400
Contingencies	3,600
Total	40,000

No. 8. *St. Johns River, Fla., aids to navigation.*—For improving the aids to navigation and establishing new aids on the St. Johns River, Fla., below Jacksonville, $66,000.

NOTE.—The present project of the United States Engineers calls for a 30-foot low-water channel from the sea to Jacksonville, and is expected to be completed by July 1, 1915. The increased depth in this river means that vessels of increased size will use this port. It will, moreover, be more than ever necessary to follow the dredged channels closely. The present post lights along the edges of the channels, already a source of much trouble and expense on account of damage by collision, if retained, would have to be moved even closer to the channels and into depths of water in which it would prove impracticable to maintain them. The present post-lantern lights are confusing by reason of their low intensity and fixed characteristic, and the large number of them necessarily visible at one time. The amount of commerce on this river is large and increasing and fully warrants any reasonable expenditure to establish an efficient system of lighted aids. It is proposed to establish 36 range lights, 14 post lights, and 21 buoys to mark this tortuous channel properly. Detailed estimate:

Foundations for 36 range lights	$14,400
Towers for same	3,600
Illuminating apparatus	22,000
14 post-light structures	1,400
16 gas buoys and appendages	21,600
5 nun buoys and appendages	1,000
Contingencies	2,000
Total	66,000

No. 9. *Woods Hole, Mass., lighthouse depot.*—For improvements at Woods Hole lighthouse depot, Mass., $50,000.

NOTE.—This depot is well located and protected in all weathers, but the work is badly handicapped by there not being a sufficient depth of water for tenders and deep-draft light vessels. It is recommended that the channel and basin around the wharf be dredged to a depth of 17 feet at low water, and it is also recommended that a brick storehouse, 35 feet by 80 feet, two stories high, with a half-pitch roof be built to replace the wooden one, which is not at all adapted for the business, and not large enough to accommodate the stock on hand in proper manner. Under present conditions the tender *Anemone* requires a supply of buoys on the fish commission dock and on the wharf at New Bedford, thus having the supplies located in three different places. The *Azalea* is required to tend and wait on the *Anemone* when anything is required from the depot's stock. This operation seriously interferes with carrying on the work properly. The dock at the fish commission is in a very dilapidated condition, and it is only a matter of a short time when the *Anemone* will not be able to dock there or keep a working supply of buoys and appendages. The front of the wharf has already been taken away and the remainder will not last for any great length of time. Detailed estimate:

Dredging channel	$35,000
Building storehouse	15,000
Total	50,000

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No. 10. *Fighting Island Channel, Mich., aids to navigation.*—For improving aids to navigation and establishing new aids in the Fighting Island Channel, Detroit River, Mich., $25,000.

NOTE.—The project for improvement of the lower Detroit River, contained in House Document No. 17, Sixty-second Congress, first session, for which an appropriation was made in the river and harbor act of March 4, 1913, is now in course of execution. This contemplates a straight channel after leaving the Grassy Island North Channel Range to the turn on to the Grosse Isle South Channel Range, a distance of some 5 miles. This will eliminate the necessity of both Mamajuda Range and Grassy Island South Channel Range, and necessitate the moving of both Ecorse Range, at the north end, and Grosse Isle North Channel Range, at the south, to proper sailing lines in the new channel.

The preferred scheme of lighting would be the establishment of separate ranges for up and down bound vessels, and of two or more side lights at about the present locations, on the west side of Grassy Island South and Mamajuda Ranges. Detailed estimate:

Establishing new range lights	$15,000
Moving present range lights	5,000
Establishing side channel lights	5,000
Total	25,000

No. 11. *Coquille River, Oreg., aids to navigation.*—For improvement of aids to navigation at or near the entrance to Coquille River, Oreg., $4,000.

NOTE.—Maritime interests have petitioned for the removal of the station to a more advantageous locality. In its present location the light is of no great benefit to navigation, and the fog signal would serve its purpose better if on the other side of the river at or near the end of the south jetty. The station is on a point of land which is being encroached upon by the Coquille River. It is proposed to establish an occulting electric light and a fog bell operated by an electric motor at or near the end of the south jetty. A cottage for the keeper will be built near the inner end of the jetty on land formed by accretion since the construction of the jetty, or on a War Department reservation near by. Detailed estimate:

Fog-signal building and tower	$300
Dwelling for keeper	2,000
Illuminating apparatus	150
Fog-signal apparatus	600
Electric wiring and poles	750
Contingencies	200
Total	4,000

No. 12. *Manhattan, Ohio, Range Lights.*—For improving the Manhattan Range Lights, Toledo, Ohio, $15,000.

NOTE.—These range lights, marking the axis of the Maumee Bay straight channel leading to Toledo, should be clearly visible after passing the Maumee Bay Range Lights for a distance of about 5 miles. The present lights are too low and are frequently obscured by smoke. They are also sometimes blanketed by vessels mooring in the lagoon. These lights should therefore be raised in order to give greater efficiency. The present wooden towers are not structurally adapted for raising, and it is proposed to replace them with steel towers. Detailed estimate:

Two steel towers, metal work	$10,000
Foundations	2,000
Erection, painting, installation	1,500
Contingencies	1,500
Total	15,000

No. 13. *Pearl Harbor, Hawaii, aids to navigation.*—For establishing aids to navigation in Pearl Harbor, Hawaii, $80,000.

NOTE.—In view of the fact that the Government has authorized the establishment of a naval station at this point, it is important that the channels and entrance be properly marked; this is rendered more important by the set of the current, which is usually across the channel in the approach, and also on account of the prevailing northeasterly winds. The necessary aids to navigation should be available at the completion of the harbor improvements. It is proposed to establish 9 lighted and 9 unlighted beacons, also 2 gas buoys at the entrance. The Secretary of the Navy, by letter of August 12, 1913, requested favorable consideration for the establishment of suitable aids to navigation in Pearl Harbor. Detailed estimate:

2 gas lighted buoys	$10,000
4 lighted beacons in exposed waters, at $5,600	22,400
5 lighted beacons in unexposed waters, at $3,500	17,500
2 unlighted beacons in exposed waters, at $4,000	8,000
7 unlighted beacons in unexposed waters, at $2,100	14,700
Contingencies	7,400
Total	80,000

No. 14. *Alaska, aids to navigation.*—For the establishment of aids to navigation and improvement of existing aids in Alaska, $60,000.

NOTE.—The appropriation of $60,000, made March 4, 1911 (36 Stat., 1431), for this purpose is practically exhausted. Many requests have been received for aids to navigation. Aids should be established in the near future on the west coast of Prince of Wales Island, Peril Strait, Noval and Olga Straits, Sitka Harbor, and numerous other places which at the present time are without aids. Thirty or more lighted aids, depending on the size and location, may be established for the sum recommended.

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No. 15. *Dog Island, Me., light.*—For establishing a light at or near Dog Island entrance to St. Croix River, Me., $3,500.

NOTE.—Several wrecks have occurred in this vicinity. The mean rise and fall of the tide is about 18 feet; and about 125,000 tons of freight are carried annually by this locality, in addition to frequent passenger service daily. It is recommended that an acetylene light with colored sector be established in the vicinity of Dog Island. Detailed estimate:

Tower, including site	$2,000
Illuminating apparatus	1,500
Total	3,500

No. 16. *Lighthouse tenders, general service.*—The Secretary of Commerce is hereby authorized, in his discretion, to use the appropriation of $200,000 for a tender for the first lighthouse district and elsewhere made by the acts of May 27, 1908 (35 Stats., 331), and March 4, 1909 (35 Stats., 970), as modified by the act of July 27, 1912 (37 Stats., 238), for the construction of two or more tenders for general service.

NOTE.—The act of July 27, 1912 (37 Stats., 970), authorized the use of the appropriation of $200,000 for a tender for the first lighthouse district and elsewhere, made by the acts of May 27, 1908 (35 Stats., 331), and March 4, 1909 (35 Stats., 970), for the construction of two tenders. It is now thought that additional small tenders may be constructed out of this appropriation, and authority is requested to extend the use of the appropriation for the construction of two or more tenders for general service.

Total, Group No. 1, $1,022,000.

GROUP No. 2.

Works considered essential for the immediate needs of navigation, and for the efficient equipment of the Lighthouse Service:

No. 17. *Detroit, Mich., lighthouse depot.*—For improvements at Detroit, Mich., lighthouse depot, $29,000.

NOTE.—The following improvements are needed:

Oil house: The arrangements for storage of oil at this depot are very inadequate and unsatisfactory, and oil is stored in one wing of the basement of the main storehouse. The capacity is, however, insufficient, making it necessary to store large quantities of oil in the depot yard, exposed to possible damage or total destruction by fire, owing to the proximity of a varnish works. Furthermore, the handling of oil would be greatly facilitated, as the new structure could be so located as to handle the oil directly from the cars.

Addition to lamp shop: The present lamp shop is greatly overcrowded, owing to the increasing number of lighted buoys and other aids in the district, necessitating a greater and increasing quantity of parts returned for repair. Spare parts can not be accommodated but must be stored in the main storehouse, inconveniently located for the work. It is necessary to do a great deal of blacksmith repair work to moorings of buoys, etc., at the depot during the closed season of navigation, and this work must now be done in the open part of the buoy shed under very severe weather conditions during the winter or at times delayed until the severe storms are over.

Storehouse for cement and lime: Owing to the large amount of construction and repair work necessary in this district, a considerable quantity of cement and lime must be kept on hand. A small building for this storage should be provided.

Reconstruction of wharf: The wharf here has undergone for many years only such repair as necessary to render it serviceable. It is an old wooden structure on cast-iron columns standing on piles cut off about a foot below water level. It should be rebuilt and extended out to the pier line to give additional capacity.

Paving Mount Elliott Avenue: The efficiency of the depot suffers somewhat from the fact that it lies at the foot of an unpaved street, so that delivery by team is difficult during the late fall, winter, and early spring. The estimated cost is $9,000, of which the United States should pay one-half.

Detailed estimate:

Oil house	$4,000
Addition to lamp shop	5,000
Cement and lime storage	2,000
Reconstruction of wharf	12,000
Paving Mount Elliott Avenue	4,500
Contingencies	1,500
Total	29,000

No. 18. *Staten Island, N. Y., lighthouse depot.*—For improvement of the offices and laboratory at the general lighthouse depot, Tompkinsville, Staten Island, N. Y., $21,000.

NOTE.—The present office quarters and laboratory at the general depot, Tompkinsville, N. Y., are located in four detached buildings, giving rise to delay and confusion in the orderly handling of work, as well as causing unnecessary expense of heating and other maintenance items. It is proposed to construct an addition which will join three of the present buildings, and make it possible to use the space so gained for the improvement of the laboratory, which is now located in the fourth building. This building is poorly adapted for laboratory purposes, but can be put to good use as a storehouse, which is also needed on account of the growth of the service. Detailed estimate:

Altering old buildings	$4,500
Foundation	1,500
Walls, rough floors, and roof	8,000
Interior finish, etc	5,000
Contingencies	2,000
Total	21,000

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No. 19. *Eighth lighthouse district, tender and barge.*—For constructing, or purchasing, and equipping a small tender and barge for eighth lighthouse district, Texas and Louisiana, $17,000.

NOTE.—The tender for the eighth lighthouse district, Texas and Louisiana, which should be a motor launch about 65 feet long, and barge to be equipped with derrick pile driver, neither to exceed 3 feet draft, are absolutely necessary for establishing and maintaining lights and daymarks along the intercoastal canals and other shallow waters of the eighth lighthouse district. That portion of the canal from Galveston, Tex., to Corpus Christi, Tex., has been completed by the War Department, and in the next year or two the canal will be open to the Mississippi River. Detailed estimate:

Motor launch	$12,000
Pile driver derrick barge	5,000
Total	17,000

No. 20. *Huron, Ohio, aids to navigation.*—For establishing aids to navigation at Huron Harbor, Ohio, $4,500.

NOTE.—The act of June 17, 1910, authorized the establishment of range lights at Huron Harbor, at a cost not to exceed $3,800, but no appropriation for the object has been made. The erection of a rear range light to serve with the present Huron Light will accomplish the desired object, but provision should also be made for a fog bell at the front light. The commerce of Huron Harbor is important, consisting principally of ore and fish incoming and coal outgoing. Over 300 vessels, with a registered tonnage of over 640,000, enter the harbor annually, with a cargo valuation of approximately $3,000,000. Detailed estimate:

Tower	$1,500
Illuminating apparatus	1,800
Fog signal apparatus	1,200
Total	4,500

No. 21. *Hawaiian Islands, lighthouse depot.*—For the construction and equipment of a lighthouse depot for the nineteenth lighthouse district, $90,000.

NOTE.—The greatest need in this district is an adequate lighthouse depot. At present the stores are kept in two small, overcrowded, leaky storerooms on the Channel Wharf, Honolulu, where they are in danger of fire on account of proximity to fishing sampans, which are careless in the handling of gasoline. The heavy stores are kept in a large room adjoining the storage rooms occupied as a depot on Channel Wharf, lately vacated by the Territory because of the condemnation of the wharf. Buoys are kept some on Channel Wharf and some on Naval Wharf No. 1. The heavier buoys can not be kept on the Channel Wharf on account of its dilapidated condition, and when placed on the Naval Dock are exposed to the weather, and are frequently covered with coal when warships are coaling. In assembling materials for any construction work it has been the custom to collect them at the Channel Wharf, and if there is any considerable amount that wharf becomes filled up, necessitating the removal of the material on account of inconvenience to other users. Hence, the lack of a depot results in much inefficiency in collecting materials as well as inconvenience and annoyance. The fact that the temporary wharf and storehouse are in a bad state of repair, having been condemned about a year ago, makes the situation very uncertain and unsatisfactory. Application for the transfer of Naval Wharf No. 3 and of a piece of land (1.2 acres) contiguous to this wharf has been made to the Navy Department. It is proposed to erect adequate buildings and improvements on this site for lighthouse depot purposes. Detailed estimate:

Repairs and enlargement of wharf	$30,000
General storehouse	28,000
Repair plant equipment	10,000
Carbide and oil house	2,000
Office building	10,000
Improvement of grounds, including walks, fences, etc	2,000
Contingencies	8,000
Total	90,000

No. 22. *Point Boringuen, P. R., Light Station.*—For the removal and rebuilding on another site of the light station and dwelling at or near Point Borinquen, P. R., $85,000.

NOTE.—The present Point Borinquen Lighthouse is improperly located at the foot of a bluff 230 feet high, which obscures the light in the northeasterly direction. To the southward, plantations of high trees obscure the light in its most desirable direction, the harbor of Aguadilla. The present tower is in bad state of repair, the top part being considered unsafe and the foundation insecure. At the present time the light is inadequate, and with the opening of the Panama Canal it will be quite insufficient, as it will then become a most important landfall light. In addition to the light, and in connection with it, it is proposed to install a wireless station which will send automatically the wireless name of the station, which will give vessels an opportunity to locate their position when distant from the shore. Detailed estimate:

Tower, including site	$30,000
Dwelling for three keepers	20,000
Illuminating apparatus	7,000
Power house and wireless outfit	4,500
Outbuildings, piping, etc	8,000
Roads and grounds	7,000
Contingencies	8,500
Total	85,000

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No. 23. *Light keepers' dwellings.*—For light keepers' dwellings and appurtenant structures, including sites therefor, within the limit of cost fixed by act approved February 26, 1907, $75,000.

NOTE.—The appropriations made March 4, 1907 (34 Stats., 1319), and May 27, 1908 (35 Stats., 334), of $75,000 each, are now exhausted, but dwellings at a number of stations are yet needed, among which may be stated: Amelia Island, Fla.; Ano Nuevo Island, Cal.; Buffalo Breakwater, N. Y.; Charlotte, N. Y.; Dry Tortugas, Fla.; Frankfort, Mich.; Oswego Breakwater, N. Y.; Piedras Blancas, Cal.; Point Hueneme, Cal.; Point Montara, Cal.; Point Sur, Cal.; Port San Juan, P. R.; Sand Island, Ala.; Tawas, Mich.; Toledo Harbor, Ohio; Two Harbors, Minn. Detailed estimate:

16 dwellings, at $4,500	$72,000
Contingencies	3,000
Total	75,000

No. 24. *Fairport, Ohio, aids to navigation.*—For improving the aids to navigation at Fairport Harbor, Ohio, $30,000.

NOTE.—The completion of the west breakwater pierhead necessitates a rearrangement of the aids to navigation at this harbor. It is proposed to discontinue the present main light on the bluff and to construct the new light on the pierhead. The west breakwater and pierhead have been completed, and on the east side the breakwater has been built up to the water line throughout its length and the pierhead crib has been placed. The annual number of vessels entering and departing is about 1,300, representing a total registered tonnage of approximately 3,000,000. Detailed estimate:

Structure	$20,000
Illuminating apparatus	6,500
Boats, piping, etc	3,500
Total	30,000

No. 25. *Sand Hills, Mich., Light Station.*—For establishing a light station and fog signal at or near Sand Hills, Mich., $75,000.

NOTE.—A light and fog signal station at Sand Hills, about 4 miles west of Eagle River, Keweenaw Peninsula, Lake Superior, would be of great service to vessels bound east from the western portion of Lake Superior in warning vessels from the dangerous reefs off the coast. It is reported that 10 vessels stranded on these reefs in recent years, with known losses of over $1,000,000. Detailed estimate:

Tower	$30,000
Fog signal	12,000
Quarters for three keepers	15,000
Outbuildings, dock, boat, etc	10,000
Contingencies	8,000
Total	75,000

No. 26. *Manitowoc Breakwater, Wis., Light Station.*—For improving the light and fog signal station at Manitowoc North Breakwater, Wis., $25,000.

NOTE.—The present frame building with corrugated iron covering, with very small wooden lantern (not large enough to admit a man) stands on the outer end of the North Breakwater, which is of stone-filled timber construction. The building is old and in poor condition. The timber sills supporting the building are badly rotted. The other timber work is deteriorating. Covering plates are rusting and breaking away at bottom. Cement floor is cracked and the building itself is shaky, due to movement and settlement of pier and to the fact that the building has been moved twice. It is liable to destruction in its exposed position and should be replaced at an early date with a steel building on a concrete base. It is proposed to install electric-driven air compressor, obtaining current from the city, with oil engine reserve drive, and to provide a brighter light. Detailed estimate:

New fog signal building, with lantern	$12,000
Fog-signal apparatus	9,000
Illuminating apparatus	1,500
Contingencies	2,500
Total	25,000

Total, Group No. 2, $451,500.

Total of works already authorized and Groups Nos. 1 and 2, $1,635,500.

GROUP No. 3.

Works considered essential for the needs of navigation and the equipment of the Lighthouse Service, and which it is recommended be undertaken as resources permit, are submitted with estimates of cost. (These items have been selected from a much larger number of recommendations submitted by the inspectors of the lighthouse districts and others.)

No. 27. *Tampa Bay, Fla., aids to navigation.*—For establishing and improving aids to navigation in Tampa Bay, Fla., $12,000.

NOTE.—Tampa is an important seaport with a large and growing commerce by sea. Owing to shallow water in Tampa Bay, deep-draft vessels can reach the city from the Gulf only by means of several comparatively narrow dredged cuts. Provision has already been made for lighting all of the important cuts

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excepting Cut D, for which lights should be provided as soon as practicable, as large vessels must pass through this cut in order to reach Port Tampa. Detailed estimate:

Concrete foundation	$2,000
Metal work towers	5,000
Illuminating apparatus	4,000
Contingencies	1,000
Total	12,000

No. 28. *Sturgeon Bay, Wis., aids to navigation.*—For establishing and improving aids to navigation in Sturgeon Bay, Wis., $12,100.

NOTE.—The present aids to navigation for entering Sturgeon Bay from Green Bay do not mark the proper channels since improvements have been made in the latter. To provide for safe navigation in this vicinity it is proposed to erect two structural steel towers, equipped with acetylene illuminating apparatus, located on Hills Point, forming a range for entering Sturgeon Bay, and to construct a small crib foundation, erecting a structural steel tower on same, and equipping it with acetylene illuminating apparatus near Powells Point, eastward of Hills Point, in the vicinity of Black Spar Buoy No. 5. The two Dunlap Reef Range Lights in Sturgeon Bay may be discontinued when these lights have been placed in commission, as they do not mark the best water. Detailed estimate:

Two towers, Hills Point	$2,200
Tower on crib foundation, Powells Point	4,000
Illuminating equipment	4,800
Contingencies	1,100
Total	12,100

No. 29. *Keweenaw Waterway, Mich., aids to navigation.*—For establishing and improving aids to navigation at or near the entrance to Keweenaw Waterway Harbor of Refuge, Portage River, Mich., $110,000.

NOTE.—The improvements by the War Department are now in progress and will probably be carried through to completion at an early date. Steps should be taken as soon as possible by the Lighthouse Service looking to the proper lighting of the entrance under the new conditions. It is recommended that a light and fog signal be erected on a separate foundation on the outer end of the breakwater, and that six nonattended lights be established to mark the harbor, and, as the work will necessitate changes at the locality, that present range lights Nos. 1 and 2 be rebuilt and provided with gas appliances. The Portage River (Main) Light may be discontinued on the completion of this project, and the dwelling retained as shore station for one keeper. Detailed estimate:

Foundation and concrete base for tower	$43,000
Superstructure	24,000
Illuminating and fog-signal apparatus	9,000
Establishing six minor lights	24,000
Rebuilding lights Nos. 1 and 2	6,000
Contingencies	4,000
Total	110,000

No. 30. *Milwaukee, Wis., lighthouse, depot.*—For the purchase or improvement of a site, the construction of a wharf and buildings, and the necessary equipment for a lighthouse depot, Milwaukee, Wis., and proceeds from sale of present depot, shall be available for purposes of this appropriation, $200,000.

NOTE.—The present depot at Milwaukee is practically surrounded by coal yards, except on the water front, and the nuisance from the coal dust makes it impossible to keep either stores or machinery in good condition. Consideration has been given to obtaining a new site which will avoid this trouble, which it is believed should be located farther up the Kinnickinnic River. Milwaukee is considered to be the logical point for the location of the principal depot of the twelfth lighthouse district, Lake Michigan and Green Bay, on account of being the leading Lake port in the district in point of commerce. Detailed estimate:

Purchase or improvement of site	$85,000
Storehouse	60,000
Wharves and revetments	50,000
Buoy platform, pavements, and walks	15,000
Oil house, fencing, and transfer of equipment	10,000
Keepers' dwelling	7,000
Contingencies	23,000
Total	250,000
Estimated proceeds present depot	50,000
Total amount needed	200,000

No. 31. *Alaska, lighthouse depot.*—For the purchase of a site for a lighthouse depot and the necessary equipment so far as funds may permit for the sixteenth lighthouse district, $40,000.

NOTE.—There is no lighthouse depot in Alaska, and the work of the lighthouse service is considerably handicapped by the lack of such facilities. Temporary quarters are now rented at $325 per month, which would be unnecessary if proper facilities were owned by the Government. It is not intended at this time to erect office quarters, etc., for which further arrangements in other Federal buildings may be made in the future. Detailed estimate:

Purchase of site	$20,500
Repairs, equipment, dock, etc	19,500
Total	40,000

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No. 32. *Point Pinos, Cal., light station.*—For improving Point Pinos Light Station, Cal., $29,000.

NOTE.—Improvements to the combined tower and dwelling at this station are required to keep them in a serviceable condition. Fogs are of frequent occurrence at this point and a first-class compressed-air signal, together with quarters for two additional keepers, are urgently required. Traffic into Monterey Harbor is steadily increasing and a number of large oil-carrying steamers now run regularly to this port, where oil is piped from the oil fields in the interior of the State. Detailed estimate:

Fog-signal building	$3,000
Fog-signal apparatus	7,000
Dwellings for two keepers	12,000
Improvements to present station	4,500
Contingencies	2,500
Total	29,000

No. 33. *Kauhola Point, Hawaii, Light Station.*—For improving the light station at Kauhola Point, Hawaii, $15,000.

NOTE.—Owing to the importance of this station, located near the northern point of the Island of Hawaii, steps have been taken to change the present lens-lantern light to a converted flashing fourth-order lens. To support this lantern and lens and to complete the improvement of this station, a new tower is necessary. Detailed estimate:

75-foot cast-iron tower	$10,000
Erection at site complete	3,600
Contingencies	1,400
Total	15,000

No. 34. *Goat Island, Cal., lighthouse depot.*—For repairs and improvements to Goat Island lighthouse depot, near San Francisco, Cal., $43,000.

NOTE.—This depot occupies a small area gained by cutting down the steep bluff at the southeast point of Goat Island in San Francisco Bay and filling in along the shore line with the material thus secured. This area and that afforded by the present wharf is now inadequate to afford a proper disposition of the property required to be stored there. This is the only depot in the district. An additional area should be filled in with excavated material to afford room for new storehouses and additional room for storing buoys. The present storehouses are merely wooden sheds, old and poorly constructed. The present wharf should be extended to afford room for working two tenders alongside at the same time, and to permit landing and loading supplies without having to shift material already stored on the wharf. The quarters provided for the depot force are old and insanitary in arrangement and location. New quarters should be provided on higher ground and the site of the present quarters utilized for the needs of the depot proper. Detailed estimate:

Retaining wall and fill	$5,000
Storehouse, reenforced concrete	18,000
Wharf, additional on iron piles	12,000
Dwelling	8,000
Total	43,000

No. 35. *Santa Barbara, Cal., Light Station.*—For improving Santa Barbara Light Station, Cal., $29,000.

NOTE.—The station is old and the tower is too small to accommodate the revolving lens now installed in it. The tower stands one-eighth of a mile back from the point of the shore line and the light is partly obscured by trees on other properties. A new tower is required to be built farther out on the point. Coasting vessels bound north keep close inshore to avoid the prevailing northwesterly wind and sea, and a fog signal should be established here with quarters for two additional keepers. An improvement has been made in changing the light from fixed to occulting and an increase of intensity. The fog signal, as well as other improvements, and a new light tower, are necessary to render the aids efficient. Detailed estimate:

Tower, lantern, and fog-signal building	$8,000
Fog-signal apparatus	7,000
Additional quarters	7,000
Improvements to present station	4,500
Contingencies	2,500
Total	29,000

No. 36. *Hilo, Hawaii, aids to navigation.*—For establishing and improving aids to navigation at Hilo, Hawaii, $19,000.

NOTE.—Hilo is the second port of importance in the Hawaiian Islands, and it is probable that the opening of the Panama Canal will greatly increase its shipping. The present lighting is inadequate. It is proposed to establish, (1) an acetylene light in place of the present lens lantern at Alia Point, the entrance to Hilo Bay; (2) a combination gas and whistling buoy in place of the Blonde Reef Whistling Buoy, with lanterns and attachments; (3) an acetylene light on the end of the Hilo Breakwater when completed. Detailed estimate:

Alia Point light	$11,000
Combination gas and whistling buoy	5,000
Hilo Breakwater light	3,000
Total	19,000

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No. 37. *Portage Lake, Mich., aids to navigation.*—For establishing a light and fog signal station upon a new site and improving aids to navigation at Portage Lake Ship Canals, Mich., $100,000.

NOTE.—The War Department intends to remove the breakwater, and it is therefore necessary to rebuild the light and fog signal on a new site. The new light and fog signal should be established on a pier at the outer entrance, where it would be of the best service to vessels making the harbor. The construction of the station proposed will require considerable time to complete, and this project should have consideration for that reason. Detailed estimate:

Dredging, piling, and cribwork	$15,000
Stone filling and riprap work	10,000
Concrete base with metal flashing	30,000
Superstructure	30,000
Fog signal and lighting equipment	9,000
Contingencies	6,000
Total	100,000

No. 38. *Ram Island, Me., light.*—For establishing a light on Ram Island, Lower Kennebec River, Me., $3,100.

NOTE.—The need of this light has several times been expressed by petition. Ram Island is about 5½ miles below Bath, Me.; it is a low island in the middle of the river, with a string of half-tide ledges making off on the easterly side. There is a passage on either side, and at some stages of the tide a 5-knot current exists, from which several accidents have occurred. About 300,000 tons of freight and 175,000 passengers are transported past this island annually, not including the many pleasure craft and small boats which frequent the river. It is proposed to establish an acetylene light on or near the easterly side of Ram Island. Detailed estimate:

Light structure, including site	$1,600
Illuminating apparatus	1,300
Contingencies	200
Total	3,100

No. 39. *Cape Kumukahi, Hawaii, Light Station.*—For establishing a light at or near Cape Kumukahi, Hawaii, $24,000.

NOTE.—Cape Kumukahi is the easternmost cape of Hawaii. There is at present no landfall light for vessels bound to Hilo from the Panama Canal or from the southeast. It is a difficult point to round when sailing from Hilo to the south point or vice versa. A light on this point would be a great improvement to the lighting of the islands. The country in this vicinity is barren, undulating lava rock. An acetylene light is recommended with a focal plane height of about 150 feet, which would be visible about 20 miles. Landing from seaward at the cape is impossible at most times, and the only practical method of supplying this station would be by railroad from Hilo to Kapoho and then by wagon road 3 miles to the cape, 1½ miles of which would have to be constructed over the rock. Detailed estimate:

Road	$6,500
Tower, including site and right of way	11,500
Illuminating apparatus	4,000
Contingencies	2,000
Total	24,000

No. 40. *Henderson Point, Me., Light Station.*—For establishing a light and fog signal at or near Henderson Point, Piscataqua River, Portsmouth Harbor, Me., $3,800.

NOTE.—The need of this aid has several times been expressed by petition. It is often very difficult to locate Henderson Point at night and in thick weather; the channel is narrow and there is a strong tide at this point, where the course changes. The commercial statistics for Portsmouth Harbor indicate about 5,600 vessels arriving and departing annually, transporting about 610,000 tons of freight. It is proposed to establish an acetylene light with fog bell. Detailed estimate:

Structures, including sites	$1,800
Illuminating and fog-signal apparatus	2,000
Total	3,800

No. 41. *Port Real, P. R., Light Station.*—For establishing a light station at or near Port Real, P. R., $34,000.

NOTE.—The lighthouse at Port Ferro, on the south coast of Vieques or Crab Island, is one of the primary seacoast lights of the Porto Rican system. The light tower and the keepers' dwelling attached to it are built on top of a rocky promontory undermined for some time by the sea waves, and the whole structure, already dangerously cracked, is in danger of collapsing. It is urgent to rebuild a lighthouse at or near this point, as this is an important aid to the navigation from St. Thomas to Cuba and other West Indian Islands and the Caribbean Sea. A light in this vicinity is necessary for navigation, and it is proposed to dismantle the present Port Ferro Light Station and to erect a new light station at Port Real, about 3 miles westward, where the aid will be more useful and on better ground than on its present location at Port Ferro, as Port Real is the most important and the best anchorage around Vieques Island. The present apparatus at Port Ferro is to be used for this new station. Detailed estimate:

Tower and dwellings for two keepers	$25,000
Outbuilding and piping	1,000
Purchase of site	2,000
Roads and grounds	2,000
Contingencies	4,000
Total	34,000

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No. 42. *Nine Mile Point, Mich., Light Station.*—For establishing a light and fog-signal station at or near Nine Mile Point, Mich., $50,000.

NOTE.—When Forty Mile Point Light Station was established it was placed on the site designated Forty Mile Point on the county-survey charts. Sailing masters expected the station to be placed at Nine Mile Point, near the entrance to the Straits of Mackinac, but which was not so called officially then. While Nine Mile Point is within the visibility of Spectacle Reef and Poe Reef Light Vessel lights, a fog signal would be of especially great service in thick and foggy weather and during seasons when forest fires prevail. Not less than nine strandings occurred here between 1903 and 1909. In the event of establishing this station, Forty Mile Point could be made a minor light. Detailed estimate:

Tower	$15,000
Illuminating apparatus	2,000
Fog-signal building and apparatus	9,000
Dwellings for three keepers	15,000
Outbuildings, boathouse, fences, etc	6,000
Contingencies	3,000
Total	50,000

No. 43. *Ludington, Mich., Light Station.*—For establishing a light and fog-signal station at Ludington, Mich., $61,000.

NOTE.—The present location of the fog-signal station on the end of south pier subjects vessels to danger of striking the breakwater. The commerce of Ludington, which includes important car ferry lines across Lake Michigan, is more important than any other port on the east shore of Lake Michigan, and as this port is most inadequately lighted now this improvement is considered well warranted. It is proposed to establish a main light on the outer end of the south breakwater, with fog-signal apparatus, consisting of electrically driven air compressor and siren with oil engine reserve drive, and to discontinue the present steam fog signal in old wooden structure. Detailed estimate:

Foundation crib and concrete pier	$30,000
Steel fog-signal building	15,000
Illuminating apparatus	2,000
Fog-signal apparatus	9,000
Contingencies	5,000
Total	61,000

Total, Group No. 3, $785,000 (not included in total of estimates).

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DESCRIPTIONS OF NEW WORKS COMPLETED.

The following are brief technical descriptions of lighthouse works completed under special appropriations since the end of the fiscal year 1912:

MANANA ISLAND FOG-SIGNAL STATION, ME.

Purpose.—The fog signal at Manana Island Fog Signal Station, Me., was increased in power to meet the needs of navigation, the old Daboll trumpet being inadequate.

Apparatus.—The apparatus consists of two first-class automatic sirens, operated by compressed air, supplied from a battery of 10 air receivers with sufficient capacity to keep the signal in operation until the compressing plant is in operation. The latter consist of two units of 25-horsepower petroleum engines and single-acting air compressors, gear connected, on same bed. Air is stored at a high pressure for immediate use.

Installation.—The apparatus was installed in the masonry Daboll trumpet house, which was modified for the purpose. The installation of a 2½-horsepower petroleum engine, with double-acting pump, was made for supplying extra water when necessary, the main supply being storm water from signal-house roof, stored in cisterns. When the plant is in operation, water used for cooling cylinders is passed through a system of pipes to dissipate heat. The signal was put in operation February 23, 1913.

Cost.—The signal was installed under the act of March 4, 1911, appropriating $10,000; the engines, compressors, and air receivers were purchased and installed by contract; the work was commenced in November, 1911, and completed in February, 1913, at a cost, including modification of house and extra water supply, of $8,296.23.

POINT JUDITH HARBOR OF REFUGE BREAKWATER LIGHTS, R. I.

Purpose.—The Point Judith Harbor of Refuge Breakwater Lights were projected in 1911 to provide lights to mark the extremities of breakwater to seaward, and furnish guides into harbor that was being formed by the building of breakwaters. Lights were established October 22, 1912.

Site.—There are four lights: East Breakwater Light, located on extreme west end of East Breakwater; Main Breakwater East Light, located on extreme east end of Main Breakwater; Main Breakwater Center Light, located on apex of angle of Main Breakwater extending seaward; Main Breakwater West Light, located on west end of Main Breakwater—the breakwaters on which lights are located are of riprap construction.

Structure.—The structures of the four lights are each made up of hollow cast-iron columns 33 feet 1 inch long, 10 inches outside diameter, in three sections. Around the top section 20 feet above high water, and 13 feet above top of the breakwater is a steel tank house 4 feet in diameter by 6 feet 7 inches high, for holding gas tanks. The roof and bottom of house are of cast iron, the sides of sheet steel, in four sections, each section being hinged to permit removal or placing of tanks. Each house is provided with rests for six gas tanks. The lower section of column is set into breakwater for a distance of 9 feet, and embedded in concrete.

Illuminating apparatus.—The East Breakwater, Main Breakwater East End, and Main Breakwater West Lights are provided with a 200-millimeter lantern; Center Main Breakwater Light with a 375-millimeter lantern. All lanterns are stormproof, have fixed light lenses, and are fitted with acetylene flashers, and use acetylene gas as an illuminant. The lights with 200-millimeter lanterns are fitted with one-half foot burners and four acetylene gas tanks. The light with 375-millimeter lanterns has 1-foot burner and 6 acetylene gas tanks.

Name.	Color.	Light.	Eclipse.	Focal plane.	Candle-power.	Miles seen.
				Feet.		
East Breakwater Light.	Occulting red.....	1 second.....	1 second.....	35	30	5
Main Breakwater Light, east.	Occulting white...	1 second	1 second.....	35	70	6.8
Main Breakwater Center Light.	Flashing white....	Flash 0.3 second, eclipse 0.9 second.	Flash 0.3 second, eclipse 4.5 second.	33	300	8.5
Main Breakwater West Light.	Occulting red.....	1 second.....	1 second.....	31	30	5

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Fog signals.—There are none.

Quarters.—There are no quarters. The lights are of the unwatched type, using acetylene gas. The gas tanks are stored in the steel tank houses near the top of column, and are up out of the reach of the sea, which frequently comes over the breakwater to a depth of several feet. Each of these lights will operate about four months on one set of tanks and without any attention.

Cost.—The lights were established under the act of March 4, 1909, appropriating $12,000. The total cost was $10,001.02; the work of building and erecting lights was done by permanent force, hired labor, and tender. Preliminary work was begun in January, 1912, and completed in November, 1912.

NEGRO POINT LIGHT STATION, N. Y.

Purpose.—Negro Point Light Station was established to mark a sharp turn in channel at which point the land is low and level, on account of which it was difficult for mariners to see the outline of shore. The station went into commission January 20, 1913.

Site.—The station is located on extreme southern end of Wards Island on northerly side of Hell Gate, East River, N. Y., on filled ground, close to sea wall surrounding the southern part of Wards Island. The concrete foundation was carried down through the filled ground to the old beach level to a bottom of stone and gravel.

Structure.—The structure consists of a concrete foundation, upon which rest the skeleton steel light and bell tower and concrete fog signal and tank house. The light tower is 32 feet high, bell tower 10 feet high, and located inside frame of light tower. The fog signal and tank house is built entirely of concrete, reinforced with ferro-inclave reenforcing; is 10 feet square and 13 feet high to peak of roof.

Illuminating apparatus.—The illuminating apparatus consists of a 200 millimeter storm-proof lantern with fixed light lens, equipped with an acetylene flasher with one-half-foot burner, white occulting light of 70 candlepower, with focal plane of 35 feet, and is visible 6¾ miles in clear weather. Acetylene gas is used as the illuminant. Station is equipped with 4 acetylene gas tanks and light will operate for about four months on one set of tanks without attention.

Fog signal.—This apparatus consists of a 1,000-pound bell operated by a No. 3 fog-bell striker; characteristic of bell, a double blow every 15 seconds. An electric striker is now being installed at this station. This was not installed when station was built, owing to difficulty in obtaining current for operating, which has since been overcome. When electric striker is installed, the characteristic of bell will be changed to a double blow every five seconds, which has been requested on account of narrow channel and great amount of traffic at this point.

Quarters.—There are no quarters; the light does not require the attention of a keeper, and fog signal is cared for by employee of the Manhattan State Hospital, who resides close by on the island.

Cost.—This station was established under the act of May 27, 1908, appropriating $10,000. The total cost of station to date is $6,807.19, and about $290 additional will be required to complete the building and installation of electric fog-bell striker. The station was constructed by hired labor and permanent force, and purchase of material. Work was commenced November 11, 1912, and station placed in operation January 20, 1913.

NORTH WHARF EXTENSION, GENERAL LIGHTHOUSE DEPOT, TOMPKINSVILLE, N. Y.

Purpose.—The North Wharf extension was built to relieve the congestion and overloading of wharves at the general lighthouse depot, the wharf room being inadequate on account of the increase in the number of buoys and quantity of materials handled by the third district. It was first used in July, 1913.

Site.—The North Wharf extension is 50 feet wide, 277 feet 7 inches long, built out in an easterly direction along the north boundary of the reservation, adjoining the outer stone bulkhead of the north wharf. The structure is on a submarine site, the outer end being within the pier line established by the Board of Engineers, 1889. Borings made over the site previous to commencing work indicated 18 feet water and 15 feet mud overlying a strata of hardpan at the inner end of the structure, and 21 feet water and 20 feet mud with an under stratum of hardpan at the outer end.

Structure.—The structure consists of piles driven in bents spaced 8 feet centers, each bent being braced with 5 by 10 inch horizontal and A bracing, and alternate bents braced with spur piles. Bearing piles are tenoned and two 6 by 12 inch cross

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clamps bolted to them. The backing logs consist of a double line of 12 by 14 inch timbers to cushion the concrete deck. The concrete deck is 10 inches thick, reenforced with five-eighths-inch square deformed bars spaced 6 inches centers. The deck is crowned at the center and 3-inch cast-iron drains spaced 4 feet centers are provided along the edges of the wharf. A standard-gauge track is provided for future use. It was proposed to build an ell extending to the southward from outer end of North Wharf extension, but the funds were not sufficient to permit. The balance of this appropriation will therefore be used to good advantage in repairing existing wharves at this depot, which are in urgent need of repairs.

Cost.—The North Wharf extension was constructed under the act of March 4, 1911, appropriating $40,000. The work was done under contract costing $29,244.13. Work was commenced July 9, 1912, and completed June 5, 1913.

MIAH MAULL SHOAL LIGHT STATION, N. J.

Purpose.—Miah Maull Shoal Light Station was established to mark a dangerous shoal of the same name on the New Jersey side of the main ship channel in Delaware Bay, about midway between Fourteen Foot Bank and Elbow of Cross Ledge Light Stations. The station went into commission February 15, 1913.

Site.—The station is located on Miah Maull Shoal, easterly side of the main channel near the widest part of Delaware Bay. It is placed on a submarine site; the depth of water is 20 feet at mean low water, and the rise and fall of the tide is 6 feet. A boring was made at the site 93 feet below bottom of bay and showed a stratum of hard compact sand over a layer of mud, below which was a layer of fine sand.

Structure.—The structure consists of a cast-iron pier filled with concrete, 40 feet in diameter at the bottom, reducing upward to 30 feet in diameter at 13 feet above low water level, and curving out into a trumpet-shaped top whose deck is 40 feet in diameter and 26 feet above mean low water. The deck supports a three-story dwelling of cast iron, circular in plan, from the roof of which projects a circular watch room, which supports a fourth-order cylindrical helical bar lantern whose focal plane is 39 feet above the deck. The main deck is covered by a veranda roof and there are galleries with railings about on a level with the watch-room floor and lantern floor. The cast-iron pier was assembled on shore, launched, towed out to the site, and sunk in place on the pile foundation. The pile foundation consists of one hundred and eighty-seven 14-inch oak piles driven 3 feet on center to a penetration of 21 feet. The heads of the piles project 1 foot above the surface of the shoal and support a 12 by 12 inch grillage upon which the cast-iron pier rests. A layer of riprap 4 feet thick and 160 feet in diameter protects the bottom about the structure.

Illuminating apparatus.—The illuminating apparatus consists of a fourth-order lens of three panels, revolving on ball bearings, driven by a standard fourth-order clock and showing a two and one-half seconds light every five seconds. The occultations are produced by three vertical screens attached to the lens and revolving with it about the lamp. The intensity of the light is 10,000 candles, the focal plane is 59 feet above mean high water, and the light is visible 13 miles in clear weather. The light is furnished by a 35-millimeter double-tank, incandescent oil-vapor lamp.

Fog signal.—The temporary apparatus consists of a 2,000-pound bell operated by a No. 3 fog-bell striker. The installation of the permanent compressed-air fog signal will be completed in November 1913. It consists of a third-class Daboll reed box with two trumpets pointing up and down the bay. The compressing outfit consists of two 5-horsepower kerosene oil engines, each gear connected to a double-acting air compressor on the same bed arranged to start in 7 minutes and capable of being converted to single acting for compressing air up to 100 pounds per square inch. The air receiver will contain air stored at this pressure for immediate use.

Quarters.—There are quarters for three keepers. They consist of a basement containing a large room for the fog signal and several small ones for coal and oil, below which are the cisterns and water tanks. The first floor contains entrance hall, kitchen, dining room, and closets. The second floor provides two bedrooms and a bathroom, and the third floor two bedrooms and closets; above this is a watch room. Supplies are landed at the station by the tender. There are two landing platforms and ladders and davits for hoisting the keepers' boats.

Cost.—The station was constructed under the acts of June 30, 1906, March 4, 1907, and March 4, 1911, appropriating a total of $105,000. It was constructed under several contracts and completed with the exception of the permanent fog signal and some minor equipment in February, 1913, and cost to June 30, 1913, $94,165.54. It is estimated that about $7,800 will be required to complete the station.

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EDGEMOOR LIGHTHOUSE DEPOT, DEL.

Purpose.—This is the main supply depot of the fourth lighthouse district and is the headquarters of the lighthouse tender. Rebuilding of the wharves and reconstruction of the sea wall became necessary, on account of general deterioration of the old structures, and the piers were widened to facilitate the handling of buoys and supplies.

Site.—The depot is located on the westerly side of the Delaware River about 27 miles below Philadelphia and 3 miles above Wilmington, Del.

Structure.—The north wharf is 40 feet wide and 328 feet long and extends into the river at right angles to the shore line. The south wharf is 28 feet wide and 318 feet long and is parallel to and 144 feet distant from the north wharf. Two hundred and twenty-five white oak supporting piles were driven to hardpan. They are about 8 feet on centers and driven in bents 12 feet apart. The superstructure of the wharf is of heart long-leaf yellow pine. The pile caps are 6 by 12 inches and support the 3 by 12 inch decking. The wharves are braced in all directions with 4 by 12 inch timbers well bolted in place. The decks are 14 feet above mean low water. The outer ends of the wharves are supported on concrete cribs. The outer walls of cribs are 3 feet thick and their interiors are filled with broken stone. The bulkhead along the shore line from wharf to wharf was rebuilt of 3 by 12 inch planking well spiked and anchored in place. About 60 linear feet of stone wall were constructed. This wall is about 14 feet high and 7 feet thick at the base. The harbor was dredged sufficiently to enable the tender to reach the inner portions of the wharves.

Cost.—The work was done under the act of March 4, 1911, appropriating $30,000. It was carried out under several contracts and in part by hired labor. The total cost was $29,968.43. It was begun on August 4, 1911, and completed in January, 1913.

STORAGE HOUSE FOR OIL, EDGEMOOR, DEL.

Purpose.—The isolated fireproof oil house for the storage of paints, oils, and inflammable materials was constructed at the Edgemoor lighthouse depot, in order to relieve the present frame storehouse from the danger of fire.

Site.—The structure is located on the south end of the bulkhead wall at the inner end of the south wharf.

Structure.—The building is 20 by 21 feet in plan and has 8-inch brick walls and a reenforced 3-inch concerte roof. Two steel trusses support the concrete roof slab, which is covered with asbestos shingles. Cast-iron ventilators are built into the brick walls and two copper ventilators are installed in the roof. There is a metal window frame glazed with wire glass in one end and the door opening is covered with a sheet-iron rolling door. Provision was made at one end for future enlargement when necessary.

Cost.—The structure was constructed under an allotment of $1,500 from the sum of $3,000 appropriated by act of May 27, 1908, for two oil houses. It was constructed under one contract and cost $1,485.65. The work was commenced September 2, 1912, and completed in October, 1912.

AIDS IN BALTIMORE HARBOR APPROACH, MD. (FORT McHENRY CHANNEL LIGHTS).

Purpose.—These aids consist of Fort McHenry Light, to mark the axis of Fort McHenry Channel, and of 13 lighted buoys marking the dredged channels of Baltimore Harbor. This work was started in July, 1913.

Site.—Fort McHenry Light is located on the southeasterly side of the Government reservation of Fort McHenry and marks the axis of Fort McHenry dredged channel. The site is about 5 feet above water. The gas buoys extend along both sides of the Craighill, Cutoff, Brewerton, and Fort McHenry dredged channels, which form a continuous channel into Baltimore Harbor.

Structures.—The structure supporting Fort McHenry Light is a skeleton steel tower, 60 feet in height, placed on concrete piers, and supports the steel tanks. The focal plane of the light is about 65 feet above water. The gas buoys are moored in about 6 fathoms of water each; are spar-shaped with skeleton superstructure supporting a lens lantern, the focal plane of which is 13 feet above water.

Illuminating apparatus.—Fort McHenry Light is provided with a 375-millimeter lens lantern, burning acetylene and showing the following: Color, flashing white; light, 1 second: eclipse, 3 seconds; focal plane, 65 feet above water; candlepower, 550; miles visible, 13.

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Each buoy is provided with a 200-millimeter lens lantern, burning oil-gas and showing the following:

No.	Color.	Light.	Eclipse.	Focal plane.	Candlepower.	Miles seen.
		Seconds.	*Seconds.*	*Feet.*		
9C	Flashing white	3	6	13	120	8½
3K	do	3	6	13	120	8½
9K	do	3	6	13	120	8½
1B	do	3	6	13	120	8½
12B	Flashing red	3	6	13	30	5
2M	do	3	6	13	30	5
3M	Flashing white	3	6	13	120	8½
6M	Flashing red	3	6	13	30	5
5M	Flashing white	3	6	13	120	8½
8M	Flashing red	3	6	13	30	5
7M	Flashing white	3	6	13	120	8½
9M	do	3	6	13	120	8½
10M	Flashing red	3	6	13	30	5

Fog signal.—This will consist of a 24-inch gong, operated by electricity, sounding a double stroke every 10 seconds. (Now being installed.)

Quarters.—There are no quarters at Fort McHenry Light, it being of the unwatched type, using compressed acetylene in acetone.

Cost.—These aids were established under the act of March 4, 1911, appropriating $125,000, and have cost $33,327.74. Additional work under this special appropriation will be a combination gas and bell buoy at the lower end of Craighill Channel; changing Cutoff Channel Front Light and Cutoff Channel Rear Light to acetylene lights; and the establishment of 30 tall nun and can buoys; and it is estimated that $29,395.11 will be required to complete the entire scheme.

CAPE FEAR RIVER LIGHTS, N. C.

Purpose.—These aids consist of 33 lights marking the dredged channels of the Cape Fear River, N. C. They replace 29 lights, mostly of the oil-burning post-lantern type on old wooden structures not properly placed to mark the new channels. Ten of the new lighted beacons were established December 1, 1912, and the remainder November 15, 1913.

Site.—The aids extend along the Cape Fear River from the entrance to Wilmington, N. C., a distance of about 29 miles. The sites are (except in three cases) submarine, the depth of water averaging 6 feet. The bottom is hard sand, underlaid with rock in a few cases.

Structures.—The substructures built on marine sites (30 in all) consist each of four reenforced concrete piles and connecting beams. These are surmounted by skeleton towers of galvanized iron pipe, carrying slatted wooden daymarks. Towers for rear range lights are 30 feet high and for front lights and others 10 feet high.

Illuminating apparatus.—A variety of apparatus has been installed, as follows:

Number of lights.	Apparatus.	Illuminant.	Characteristic.	Candlepower.
1	Reflector	Oil	Fixed	3,100
1	Range lens	Acetylene	Flashing every second	3,000
1	4th-order lens	do	Occulting every 2 seconds	830
7	300-mm. lens lanterns	do	Flashing every second	200
1	do	do	Flashing every 3 seconds	200
6	do	do	Occulting every 2 seconds	200
16[a]	do	Oil	Fixed	170

[a] Fourteen of these have not yet been delivered, and post lanterns of 45 candlepower are temporarily in use. The lens lanterns will be installed in January, 1914.

In general, acetylene is used as the illuminant where feasible, for a distance of about 20 miles from the entrance, and oil from there to Wilmington. All acetylene lights are white, rear lights being occulting every two seconds and front lights flashing every second. All oil lights are fixed, rear lights to be white and front lights to be red in the final installation. Eight of the white range lights which could be suitably

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located abreast of turns in the channel are provided with red sectors of 30 degrees covering these turns.

Fog signals.—There are none.

Quarters and attendance.—There have been no quarters provided, all lights being unwatched. The change of illuminant in Bald Head Light, which constitutes a unit of this system, makes quarters no longer necessary in connection therewith. The entire group of lights is cared for by two post light keepers, one resident near Southport near the entrance having charge of 3 oil and 16 gas lights, and one at Wilmington at the other end of the group of lights having charge of 14 oil lights. All gaslights are so located that gas tanks can be landed from launch directly on the structure, except at Bald Head Light.

Cost.—These improvements in the lighting of the Cape Fear River are being made under act of March 4, 1911, appropriating $21,000, and act of August 26, 1912, appropriating $30,000 additional. The total expenditures and obligations for the 33 lights to September 30, 1913, is $50,076.30, with a probable further expenditure of $500 for one additional light and $300 for clearing timber which partially obstructs one range line.

SUPERIOR ENTRY LIGHT STATION, WIS.

Purpose.—The reconstruction of the harbor entrance necessitated the establishment of new lights on the ends of the new pierheads and breakwaters, and a fog signal on the south breakwater. The old fog signal and range lights have been discontinued. The north breakwater light and the inner north pierhead light went into commission on October 10, 1912. The south breakwater light and fog signal went into commission on June 30, 1913. The inner south pierhead light will be placed in commission as soon as the remains of the old breakwater have been completely removed.

Site.—The main light and fog signal are located on the outer end of the new south breakwater at the entrance to Superior and St. Louis Bays. Three minor lights are located on the outer end of north breakwater and inner north and south pierheads, respectively.

Structures.—(*a*) Main light and fog signal: This structure proper is oblong in plan, carried on a rectangular concrete base 11½ feet high, rising from the level of the breakwater. It is two stories high, with tower rising through roof near outer end. Reenforced concrete is used throughout in the construction, with structural steel framing to carry the floor and roof slabs of reenforced concrete, circular in plan, surmounted by a cast-iron deck and fourth-order helical bar lantern, whose focal plane is 59 feet above the top of the breakwater. The interior of outside walls of building and tower are all waterproofed and lined with terra cotta furring tile, plaster finished. The partition walls are of expanded metal, cement plastered. Stairs are all of cast iron. The rectangular pier is vaulted to give storage for oil, paints, gasoline, water tanks, etc., reached by stairs from building proper. The first story of building houses air compressors and tanks and heating plant, and has rooms for toilet and cold storage. First floor is concrete. On the second floor there is a kitchen, living room, three bedrooms, and bathroom. The tower is made up of a siren room housing the trumpets and automatic apparatus, and over this a service room beneath the lantern. Roof is of copper. Floors of second story are wood and in tower are concrete.

(*b*) North breakwater light: This structure is a 50-foot skeleton steel tower on a square solid concrete base 7 feet high, near the outer end of the north breakwater, supporting a lens lantern whose focal plane is 59 feet above the top of the breakwater. A steel shelter house for gas tanks rests on the center of the concrete block. The light on top of tower is reached by a ladder, and platform and gallery of structural steel is provided at top.

(*c*) Inner north pierhead light: This structure is a 25-foot skeleton steel tower surmounting a pyramidal steel tank house secured to the concrete pierhead at its outer end and supporting a lens lantern whose focal plane is 26 feet above the top of the concrete pierhead.

(*d*) Inner south pierhead light: This structure is in all respects the same as that above described for the north pierhead.

Illuminating apparatus.—(*a*) Main light: This apparatus consists of a fixed fourth-order lens on pedestal, with rotating screen inside lens, mounted on ball bearings and driven by a standard fourth-order clock, giving an occulting white light, thus: Light, 5 seconds; eclipse, 5 seconds. The intensity of the light is 2,900 candlepower, focal plane 70 feet above the water, and is visible 16 miles in clear weather. The light is furnished by a 35-millimeter lamp, incandescent oil vapor, double-tank type.

(*b*) North breakwater light: This apparatus is a 375-millimeter lens lantern fitted with automatic flashing apparatus and sun valve for closing off gas during the day. The light is double flashing, white, thus: Light, 0.3 second; eclipse, 0.9 second; light,

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0.3 second; eclipse, 4.5 seconds. The candlepower is 390, focal plane 70 feet, and the light is visible 14 miles in clear weather.

(*c*) Inner north pierhead light: This apparatus is a 200-millimeter lens lantern fitted with automatic flashing apparatus and sun valve. The light is flashing white, thus: Light, 1 second; eclipse, 1 second. The candlepower is 130, focal plane 39 feet, and the light is visible 10 miles in clear weather.

(*d*) Inner south pierhead light: This apparatus is the same as for north pierhead; except that light will be red, of 40 candlepower, visible 7 miles in clear weather.

Fog signal.—This apparatus consists of duplicate 6-inch automatic sirens, blown by compressed air. The compressed air is furnished by two 22-horsepower straight-line gasoline-driven air compressors on main floor.

Quarters.—The old double dwelling ashore is continued as a shore residence for the keepers, and the kitchen, living room, three bedrooms, and bath on second floor of main structure furnish living quarters while on the pierhead. Supplies are landed directly on the pier by tender. All rooms are steam heated. The two minor lights now in commission and the one yet to be placed in commission are nonattended, except for occasional visits, by the keepers of main station.

Cost.—The new structures were erected under the acts of June 30, 1906, appropriating $20,000, and of March 4, 1911, appropriating $25,000. The work has been carried out under several contracts, the base having been erected in the fall of 1911 and the superstructures and minor lights in 1912. The cost to date is $32,583.67. A few minor items are yet to be completed, and there is a possibility that an additional light near the inner end of the south pierhead will be required when further dredging is accomplished by the War Department.

DWELLING FOR ASSISTANT KEEPERS, DULUTH RANGE LIGHT STATION, MINN.

Purpose.—There are three keepers employed at this station, but until this season quarters were available for the principal keeper only. The assistants were forced to rent houses in the city. This hardship on the assistants was relieved by the purchase of a lot and erection of a double dwelling. The dwelling was first occupied in February, 1913.

Site.—The dwelling is erected on a city lot fronting Lake Avenue, nearly directly opposite the lot on which keeper's dwelling is located. The lot stands about 8 feet above lake level.

Structure.—The dwelling is of solid brick construction, two stories high, on concrete foundation. The roof is asbestos shingles. Each set of quarters consists of vestibule, living room, dining room, kitchenette and pantry on first floor, with two bedrooms and bath on second floor. Each side has hot-water heating plant.

Cost.—The lot was purchased and the building constructed under the appropriation for light keepers' dwellings, dated May 27, 1908, at a cost of $701.50 for the lot and $6,477.31 for the building, making a total cost of $7,178.81. The construction work was accomplished by purchase of material and hire of labor, after bids had been invited for the work as a whole and rejected as being excessive.

NORTH POINT LIGHT STATION (MILWAUKEE), WIS.

Purpose.—On account of the growth of trees in Lake Park, Milwaukee, Wis., it was impossible to see the light on the northerly inshore course, the old tower to focal plane above grade being only 36 feet. The tower was raised approximately 32 feet higher; work was completed and light went into commission December 15, 1912. Station was established 1838.

Site.—The station is located on point about 1 mile north and east of North Point, Milwaukee, in the southerly part of Lake Park, on lighthouse reservation, on clay cliff about 86 feet above mean lake level.

Structure.—The original light tower was of cast iron, octagonal, lined with brick, upon a concrete foundation. This old tower was entirely taken down; new octagonal structural, steel frame subtower incased with steel plates was erected upon a concrete foundation, which was built around original foundation, and the cast-iron shell of old tower and old lantern was reerected on top of new structural steel subtower.

Illuminating apparatus.—The illuminating apparatus consists of a fixed fourth-order, having two vertical flash panels rotating on ball bearings in groove, driven by clockwork, and giving a flash every 30 seconds. The intensity of each flash is estimated at 8,700 candlepower. The focal plane of the light is 154 feet above mean lake level, and is visible 21 miles in clear weather. The light is furnished by a gas lamp with mantle of 217 candlepower using city coal gas.

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Cost.—This improvement was done under the act of March 4, 1909, appropriating $10,000. The total cost was $9,455.15 and the work was done by formal contract, commencing July, 1912, and completed April, 1913. The light went into commission December 15, 1912, and temporary tower was removed.

AIDS TO NAVIGATION, ALASKA.

Purpose.—During the year 15 additional acetylene lights were established and 3 existing lights were converted to acetylene, at certain points in Alaska, to meet the demands of an increasing commerce and to continue the work of properly lighting and marking these waters. Dates of establishment, sites, structures, and illuminating apparatus are given in tables following:

No.	Name of light.	Site or locality.	Structure.	Illuminating apparatus consists of—
1	Spanish Islands...	Sumner Strait.....	Pyramidal structural steel tower, resting upon a concrete block and supporting a lens lantern whose focal plane is 24 feet above ground line.	375-mm. lens and ½-foot burner showing flashing white light.
2	Warburton Island.	Nichols Passage.....	A small wooden house supporting a lens lantern; focal plane is 9 feet above ground line.	200-mm. lens and ½-foot burner showing flashing white light.
3	Blank Island.....	.....do.....	.....do.....	200-mm. lens and ½-foot burner showing a double white flash.
4	Shakan Bay.....	Sumner Strait.....	A small wooden house supported by a structural steel platform and supporting a lens lantern; focal plane is 18 feet above ground line.	200-mm. lens and ½-foot burner showing a flashing white light.
5	Sukoi Islets.....	Frederick Sound.....	A small wooden house supporting a lens lantern; focal plane is 9 feet above ground line.	Do.
6	Cape Fanshaw....	.....do.....	A small wooden house supported by a structural steel platform and supporting a lens lantern; focal plane is 18 feet above ground line.	200-mm. lens and ½-foot burner showing a double white flash.
7	Mitkoff Island....	Wrangell Strait.....	A small wooden house supporting a lens lantern; focal plane 9 feet above ground line.	200-mm. lens and ½-foot burner showing a double red flash.
8	Midway Rock.....	.....do.....	.....do.....	Do.
9	Busby Island.....	Prince William Sound	.....do.....	200-mm. lens and ½-foot burner showing a flashing white light.
10	Point Helen.....	Montague Strait, Prince William Sound.	.....do.....	Do.
11	Lone Tree Point..	Elrington Passage, Prince William Sound.	.....do.....	Do.
12	Seal Island.....	Montague Strait, Prince William Sound.	.....do.....	Do.
13	Channel Island....	Orca Bay, Prince William Sound.	.....do.....	Do.
14	Vichnefski Rock..	Sumner Strait.....	A small wooden house supported by a structural steel tower and supporting a lens lantern; focal plane 30 feet above ground line.	Do.
15	Key Reef.....	Clarence Strait.....	A small wooden house supported by a truncated pyramid and supporting a lens lantern; focal plane 12 feet above ground level.	Do.
16	Point Hugh.....	Stephens Passage.....	A small wooden house supporting a lens lantern; focal plane 9 feet above ground level.	Do.
17	Grave Point.....	.....do.....	.....do.....	200-mm. lens and ½-foot burner showing a double white flash.
18	Lord Rocks.....	Dixon Entrance.....	A small wooden house supported by a structural steel tower and supporting a lens lantern; focal plane is 24 feet above ground line.	200-mm. lens and ½-foot burner showing a flashing white light.

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No.	Name of light.	Characteristic.	Intensity.	Focal plane above mean high water.	Miles seen.	Cost.	Date of establishment.
			Candle-power.	*Feet.*			
1	Spanish Islands..	Flash, 0.5 sec.; eclipse, 4.5 sec...	310	45	12	$1,967.09	July 26, 1912
2	Warburton Island	Flash, 0.3 sec.; eclipse, 2.7 sec ...	130	35	9	1,045.36	July 20, 1912
3	Blank Island.....	Flash, 0.3 sec.; eclipse, 0.9 sec.; flash, 0.3 sec.; eclipse, 4.5 sec.	130	30	9	1,221.48	July 19, 1912
4	Shakan Bay.....	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	25	9	1,464.52	Aug. 23, 1912
5	Sukoi Islets.....	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	20	9	1,187.87	Aug. 12, 1912
6	Cape Fanshaw....	Flash, 0.3 sec.; eclipse, 0.9 sec.; flash, 0.3 sec.; eclipse, 4.5 sec.	130	35	9	1,340.63	Aug. 13, 1912
7	Mitkoff Island....	Flash, 0.3 sec.; eclipse, 0.9 sec.; flash, 0.3 sec.; eclipse, 4.5 sec.	55	14	7	1,244.83	Aug. 12, 1912
8	Midway Rock....	Flash, 0.3 sec.; eclipse, 0.9 sec.; flash, 0.3 sec.; eclipse, 4.5 sec.	55	14	7	1,229.47	Aug. 10, 1912
9	Busby Island.....	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	25	9	1,400.88	Oct. 9, 1912
10	Point Helen.....	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	35	9	1,340.27	Oct. 4, 1912
11	Lone Tree Point..	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	25	9	1,287.07	Oct. 3, 1912
12	Seal Island.....	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	45	9	1,402.67	Oct. 10, 1913
13	Channel Island...	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	32	9	1,333.13	Oct. 5, 1913
14	Vichnefski Rock..	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	35	9	1,972.04	Oct. 25, 1912
15	Key Reef.....	Flash, 1 sec.; eclipse, 9 sec.....	130	35	9	1,548.54	Oct. 4, 1913
16	Point Hugh.....	Flash, 0.5 sec.; eclipse, 4.5 sec...	130	25	9	1,223.97	Dec. 31, 1912
17	Grave Point.....	Flash, 0.5 sec.; eclipse, 1.5 sec.; flash, 0.5 sec.; eclipse, 7.5 sec.	130	45	9	1,269.37	Jan. 3, 1913
18	Lord Rocks.....	Flash, 0.3 sec.; eclipse, 2.7 sec...	130	33	9	1,808.25	May 18, 1913

Fog signals.—There are none.

Quarters.—There are no quarters for these beacons, the lights being of the unwatched type, using compressed acetylene in acetone. The tanks containing the gas are landed at the stations by boat from the tender.

Cost.—These aids were established under the act of March 4, 1911, appropriating $60,000. Their total cost is $25,287.44. The work was carried out by the purchase of materials and hired labor.

LINCOLN ROCK LIGHT STATION, ALASKA.

Purpose.—This station was established in 1903 as a guide through Clarence Strait and to mark the rock itself, a dangerous obstruction to navigation, exposed only at low water and submerged at high tide. As the station was badly damaged by storms in 1909 and 1910 it was decided to rebuild the keepers' quarters and fog signal on a small island 440 yards east of the rock. The new station went into commission on October 10, 1912. On the same date the old light was changed to an unattended acetylene light.

Site.—The station is located on Lincoln Rock and Lincoln Island on the east side of Clarence Strait near its north end. The area of the rock is about one-half acre, that of the island about 4 acres. The latter is rocky and partly wooded.

Structure for light.—The light is exhibited from a square steel skeleton tower secured to a concrete block, located on the old concrete foundation, the frame structure having been taken down. The focal plane of the light is 41 feet above the deck of the old foundation.

Illuminating apparatus.—This consists of a 375-millimeter lens, using a 1-foot burner and shows a double white flash every six seconds. The intensity of the light is rated at 390 candles, the focal plane is 58 feet above mean high water, and the light is visible 13 nautical miles in clear weather. The illuminant is compressed acetylene gas, stored in a vault in the concrete block.

Fog signal.—The fog signal consists of a third-class reed horn, blown by compressed air and sounding a blast of three seconds every half minute. The compressing plant consists of two 5-horsepower petroleum-oil engines, each geared to an air compressor on the same bed.

Quarters.—The quarters for the two keepers are located in the same building with the fog signal, which is a two-story frame structure located about the middle of the island. The first floor contains a hall separating the fuel room on one side from the storeroom and workroom on the other, and leads into the fog-signal room. The second floor contains a kitchen, pantry, living room, three bedrooms, and a bathroom. A

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frame boathouse is located a little distance north of the quarters on a deep indentation, or cove, near the northern side of the island. Supplies are landed in this cove by boat from the tender.

Cost.—The station was rebuilt under the act of March 4, 1911, appropriating $25,000. The total cost of the work to date is about $23,632. It was carried out by the purchase of materials and hired labor. The work was commenced with the preliminary survey in March, 1911, and was practically completed in October, 1912; some minor details, covering about 3 per cent of the work, remain to be done.

ALKI POINT LIGHT STATION, WASH.

Purpose.—Alki Point Light Station, Wash., was projected in 1895 (under the name of Battery Point), as the post light then maintained was of little value in foggy weather. The point marks the southerly side of the approach to Seattle Harbor and is an important turning point and point of departure for vessels plying on the Sound to the southward. The station was established June 1, 1913.

Site.—The station is located on the southerly side of the entrance to Seattle Harbor on the site mentioned above. The site consists of a gently sloping point about 11 feet above high water surrounded by a gravel beach, and contains about 1.67 acres.

Structure.—The structure consists of a concrete one-story fog-signal building with an octagonal concrete three-story tower attached to the rear or easterly face. The fog-signal building is roofed with asbestos shingles and the tower is surmounted by a fourth-order cylindrical, helical, bar lantern whose focal plane is 30 feet 9 inches above the ground.

Illuminating apparatus.—The lantern is provided with a fourth-order group flashing lens of five panels, reenforced by mirrors, showing five white flashes every 10 seconds with an eclipse between groups of about 5 seconds; it is driven by a fourth-order clock. The light is furnished by a 35-millimeter double-tank incandescent oil-vapor lamp. The intensity of the flashes is rated at 16,600 candlepower each, the focal plane is 35 feet above mean high water and is visible 11 nautical miles in clear weather.

Fog signal.—The apparatus consists of a third-class Daboll trumpet blown by compressed air, supplied from an air receiver of about 120 cubic feet capacity. The compressing plant consists of two units of 4-horsepower petroleum engines and double-acting single-stage compressors connected by silent chain drive on the same bed.

Quarters.—There are quarters for two keepers with families provided in two detached frame dwellings in rear of the light structure. The dwellings are one and a half story buildings with concrete foundation and basement. The first floor consists of kitchen, dining room, parlor, bedroom, and bathroom and the upper story three bedrooms with storerooms and closets. Supplies are landed on the beach in front of the station or are delivered by wagon at the rear.

Cost.—The station was constructed under acts of June 28, 1902, February 26, 1907, and June 17, 1910, appropriating in all $47,000; the total cost was $46,826.16. It should be stated that the site alone cost $19,145.40, or very nearly one-half the total of the appropriations. The construction of the buildings was done by contract and the installations of the apparatus by hired labor. Work was begun on the buildings on July 11, 1912, and completed April 29, 1913.

SAN PEDRO BREAKWATER LIGHT STATION, CAL.

Purpose.—San Pedro Breakwater Light and Fog Signal Station was established to mark the outer end of the breakwater and to guide vessels into Los Angeles Harbor, Cal. This station went into commission March 1, 1913.

Site.—The station is located upon a monolithic block of concrete at the outer end of San Pedro Breakwater, Los Angeles Harbor, 2.1 miles from the mainland. The depth of water is 51 feet at mean low water and the character of the bottom is a hard, blue shale covered with a few inches of fine sand. The substructure of the breakwater consists of riprap, having on the harbor side the natural slope of stone dumped into water, about 1 on 1.3, and on the ocean side a slope of 1 on 3 to a depth of 12 feet below mean low water, and the natural slope from this depth to the bottom. This concrete block was constructed as a part of and a finish to the end of the breakwater, 40 feet square, 20 feet in height, and the top 11 feet above mean high water.

Structure.—The lighthouse has a structural steel framework throughout, setting on a concrete curb built 3 feet 8 inches high on the concrete block. The first story and deck above are octagonal in plan and covered with steel plates. The outside balcony, which is 2 feet 8 inches higher than the second floor, has a steel parapet. The second story is dodecagonal in plan and the third, fourth, and fifth stories are cylindrical.

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The exterior walls of these four stories are covered with cement plaster on reenforcing metal, the circular wall being divided into 12 panels by cement plaster, pilasters covering the 12 steel columns of the tower framing. The interior partitions are also of cement plaster on reenforcing metal. The lower floor is of wood, the second floor of steel plate, the floors of the three stories above of wood on steel beams and the lantern deck of cast iron. Surmounting the tower is a third-order, cylindrical, helical-bar lantern, the focal plane of which is 59 feet above the top of the pier. The lantern gallery has a circular cast-iron parapet in 12 sections with bronze panels. Surrounding the curb 3 feet of reenforced concrete, with a molded projection around the sides, has been added to the block, making the top of the pier 14 feet above mean high water. Wrought-iron posts and double chains form a railing around the edge of the pier. Two I beams set in concrete and projecting from the harbor side of the pier have chocks forming a cradle for supporting a launch. A swinging-boom derrick, with a hoisting engine bolted to the mast, is provided for hoisting the station launch to and from the cradle.

Illuminating apparatus.—The illuminating apparatus consists of a fourth-order bivalve flashing lens, revolving on a ball bearing, driven by clockwork and showing a white flash, estimated at 69,000 candlepower, every 15 seconds. The light is furnished by a 35-millimeter, type B, incandescent oil-vapor lamp with a single tank. The focal plane is 73 feet above mean high water, which gives a geographic range of visibility of 14 miles.

Fog signal.—The fog-signal apparatus consists of two 6-inch automatic sirens blown with compressed air supplied by duplicate, 22 horsepower, direct-connected gasoline engine driven air compressors. The engines are of the horizontal, four-stroke cycle type and the compressors have 10 by 18-inch single-acting cylinders. The engines are self-starting with the magneto, and no battery is used. The engine and compressor composing each unit have opposed cylinders and are connected to the same shaft on one base.

Quarters.—There are quarters for three keepers, without families, in the tower. The lower floor contains the fog-signal machinery, water and fuel tanks, water-supply pumps, and space for tools and a workbench. There also is a concrete cistern beneath the floor. The second story consists of a bathroom, closet, storeroom and hall. The third story provides a living room and kitchen, pantry and hall. The fourth story has two bedrooms with closets, a toilet and hall, and the fifth story a bedroom with closet, the watchroom and hall. Supplies are landed on the breakwater by boat from a tender or brought from San Pedro by the keeper's launch. Heavy articles are handled by the derrick.

Cost.—The station was established under the act of March 4, 1911, appropriating $36,000, and the total cost was $35,971.49. The structural steel work was constructed and erected under contract, this work being commenced in March, 1912, and completed in September, 1912. All other work was subsequently done by hired labor and purchase of materials and the station was completed in June, 1913.

FOG SIGNAL AND ADDITIONAL QUARTERS, POINT LOMA LIGHT STATION, CAL.

Purpose.—A fog signal was established at this station to enable vessels to enter San Diego Bay during the fogs which occasionally prevail during the winter and spring months. The commerce of this harbor is rapidly increasing, a channel carrying 30 feet of water over the bar has recently been completed, and with the fog signal in operation, larger vessels are not delayed in entering or leaving port during fog. Fog signal placed in commission March 1, 1913.

Site.—The fog-signal building is located immediately behind the light tower on the southern end of Point Loma, compressed air being carried to sirens and horns placed in front of tower, directly on the point.

Structure.—The fog-signal building is a hollow terra cotta block structure 24 feet by 25 feet 6 inches outside, the walls inside and out cement plastered, floor concrete, roof covered with diagonal red asbestos shingles.

Fog signal.—This apparatus consists of duplicate 6-inch automatic sirens blown by compressed air. The compressing plant consists of duplicate 10 by 18 inch single-acting compressors, direct connected to 22-horsepower gasoline engines on the same beds. The sirens are located about 20 feet distant from the fog-signal building supported in a metal framework.

Quarters.—Additional quarters for one keeper have been built. They consist of a two story and basement dwelling of hollow terra cotta block, the walls plastered with cement plaster outside, and with hard wall plaster inside; the roof covered

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with diagonal red asbestos shingles. The first floor consists of inclosed porch, hall, living room, dining room, kitchen, and laundry, and the second floor has three bedrooms and bath.

Cost.—The fog signal was established and quarters constructed under the act of August 24, 1912, appropriating $17,500. The total cost was $17,464.48. The work was performed by hired labor, and was commenced in December, 1912, and completed June 25, 1913.

KILAUEA POINT LIGHT STATION, HAWAII.

Purpose.—This station was established in order to provide a landfall light for the large traffic bound to Honolulu from the Orient. Mana Point on the west coast of Kauai Island was first considered as a site but the majority of the trans-Pacific steamship companies favored Kilauea Point on the north coast of the island and the station was placed there. It went into commission May 1, 1913.

Site.—The station is located on the northeastern coast of Kauai Island, on a site 180 feet above high water, a good foundation of hard volcanic rock having been obtained by excavating to depth of approximately 11 feet. The area of the reservation is 31 acres with a perpetual right of way of 3¼ acres to the nearest Government road and includes in addition a small island of 5 acres, north of the reservation.

Structure.—The lighthouse, which is of reenforced concrete, is slightly conical in shape, rests upon a cylindrical foundation and supports a first order cylindrical helical-bar lantern whose focal plane is 37 feet 7 inches above the ground. Including the basement, there are four stories in the tower which are connected by flights of cast-iron stairs. A wrought-iron clock-weight tube located in the center of the tower terminates at the watch-room floor and serves as an additional support for three of the floors and the lens. There is an air lock in the service room inclosing the stairs to the watch room, and the latter is provided with large air registers for ventilation.

Illuminating apparatus.—This consists of a second-order flashing lens, composed of two groups of two panels each, each panel subtending an angle of 90°. Each panel is made up of 7 refracting and 17 reflecting prisms. The apparatus rotates on a mercury float, driven by clockwork with maintaining motion and gives a double white flash every 10 seconds. The intensity of the flashes is estimated at 250,000 candles, the focal plane is 217 feet 7 inches above mean high water and the light is visible 21 nautical miles in clear weather. The light is furnished by a 55-millimeter double-tank incandescent oil-vapor lamp.

Fog signal.—There is none.

Quarters.—The quarters for the three keepers consist of three one-story blue volcanic rubble stone dwellings, with drinking water supply and complete plumbing system, and are connected with each other and the lighthouse by a system of roads. The main floor of each dwelling contains a kitchen, storeroom, pantry, laundry, living room, two bedrooms, and a bathroom. There are front and back porches to each house. A barn and water tank are located on the reservation at convenient points and there is an oil house close to the lighthouse. Supplies are landed in the cove southwest of the tower by boat from the tender and thence are hoisted by cable to the top of the cliff just south of the tower where the engine house and workshop are located.

Cost.—The station was constructed under the act of May 27, 1908, appropriating $75,000. The total cost to date amounts to $74,629.41. The work was carried under a contract for the metal work for the tower, and the erection of the tower and other buildings by purchase of materials and hired labor. The work was commenced with a preliminary survey in April, 1909, and was practically completed in May, 1913. About 2 per cent of the work remains to be done.

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REPORT

OF THE

SUPERINTENDENT, U. S. COAST AND GEODETIC SURVEY

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REPORT

OF THE

SUPERINTENDENT, U. S. COAST AND GEODETIC SURVEY.

DEPARTMENT OF COMMERCE,
COAST AND GEODETIC SURVEY,
Washington, October 4, 1913.

SIR: I have the honor to submit the annual report of progress in the Coast and Geodetic Survey for the fiscal year ended June 30, 1913. It is accompanied by maps illustrating the general advance in the field work of the Survey up to that date.

GENERAL STATEMENTS OF PROGRESS.

During the fiscal year ended June 30, 1913, satisfactory progress was made in the survey of the coasts and in the interior of the United States and of territories under the jurisdiction of the United States, although in some localities, notably on the coast of Alaska, the weather conditions during the greater part of the working season were unfavorable for the rapid prosecution of field work.

HYDROGRAPHIC WORK.

On the Atlantic coast most of the hydrographic work done was in the nature of revision to show changes that have taken place in natural or artificial features, to investigate reported dangers, and to supplement former surveys found inadequate for the requirements of modern navigation. The examination with the wire drag of important harbors and channels has been continued, and this work has amply justified itself by the large number of previously uncharted rocks and shoals that have been discovered. Necessity for similar work on the Pacific coast has led to a supplemental estimate under the head of "Party expenses, Pacific coast" in order that funds may be provided for this important object.

The steamer *Bache* was employed on the coasts of Georgia, Florida, Delaware, Maryland, and South Carolina; the steamer *Endeavor* in Chesapeake Bay, on the coast of North Carolina and in Narragansett Bay; the steamer *Hydrographer* in coast pilot work between Key West, Fla., and Chesapeake Bay and on the coast of North Carolina; and the schooner *Matchless* on the survey of the Mattaponi, Pamunkey, and Elizabeth Rivers, Va.

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Several parties were engaged in the revision of surveys on the Atlantic coast and an officer with headquarters at New York has acted as inspector of the section of coast between Rhode Island and New Jersey.

On the Pacific coast of the United States the steamer *Gedney* was employed during the winter months in revising the hydrography of Olympia Harbor, Bellingham Bay, and other harbors on the coast of Washington. An officer stationed at Seattle was engaged in inspecion duty on the coast of Washington and Oregon, and another with headquarters at San Francisco performed similar duty on the coast of California.

In Alaska surveys have been made in Tlevak Strait, Prince of Wales Island, Karta Bay, Kasook Inlet, Sukkwan Narrows, San Cristoval Channel, and Ulloa Channel; Turnagain Arm, Cook Inlet; Sumner Strait; approaches to Kuskokwim River; Aialik Bay and approaches and Nakat Harbor; between Naked Island and Port Wells, Prince William Sound; in Clarence Strait; Klawak Inlet; Knights Island Passage; Culross Island to Port Nelly Juan; Burnett Inlet and Davidson Inlet, Unimak Pass, including Shumagin Islands, and a search was made for Leonard and Anderson rocks. The steamers *Patterson*, *Gedney*, *McArthur*, *Explorer*, *Taku*, and *Yukon* were employed on surveys in Alaska during the season available for work. During the winter months the steamer *Patterson* was employed in hydrographic surveys on the coast of Maui, and off the west coast of Molokai, Hawaiian Islands.

An important work in Alaska was the survey of Tlevak Strait, Prince of Wales Island, which has made available a passage hitherto feared and avoided by navigators. By its use steamer routes may be considerably shortened.

In the Philippines the general survey of the islands has been continued by the Coast and Geodetic Survey steamer *Pathfinder* and by the steamers *Marinduque*, *Research*, *Romblon*, and *Fathomer*, supplied for the purpose by the insular government, the expenses of the work being divided between the United States and the insular government.

Surveys were made by the vessels named on the southeast coast of Mindanao and the southwest coast of Negros; on the Apo Reef and Busuanga Island, and between the Cuyos Islands and Palawan; in Ragay Gulf, southwestern Luzon, on the west coast of Mindanao and the west coast of Mindoro; in the area bounded by Luzon, Burias, Masbate, and Tablas Islands, in the vicinity of the Lubang Islands and the Calamianes group; and in the area bounded by Samar, Leyte, Biliran, and Masbate Islands.

GEODETIC, MAGNETIC, AND TIDAL WORK.

Two triangulation parties and a separate signal building party were employed on the primary triangulation along the one hundred and fourth meridian from the vicinity of Colorado Springs, Colo., to the Canadian boundary. This arc of triangulation, extending for a distance of 720 miles and involving the occupation of 100 primary stations, was completed in a single season.

A party was engaged in making a reconnoissance for the extension of the primary triangulation of the ninety-eighth meridian from

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Alice, Tex., to the Mexican boundary, and another party was employed in the execution of this triangulation which will connect with that executed by the Mexican Government.

One party revised the triangulation on the coast of Louisiana in the vicinity of Cote Blanche and Atchafalaya Bay, and another the triangulation of Laguna Madre, Tex.

A secondary triangulation along the coast of Washington was begun.

Two parties were employed in running a line of precise levels between Crookston, Minn., and Butte, Mont., and one party was employed in running a line of precise levels between San Francisco, Cal., and Beowawe, Nev. Determinations of the difference of longitude were made by two cooperating observers at stations near the one hundred and fourth meridian in Nebraska, Colorado, Wyoming, and Montana.

Several parties were employed in determining the positions of aids to navigation and of wireless telegraph stations along the Atlantic and Pacific coasts, as requested by the Bureau of Navigation of the Department of Commerce.

The inspector of geodetic work inspected the operations of the triangulation parties engaged in the connection of the ninety-eighth meridian triangulation with that of the Mexican Government.

The usual absolute observations for magnetic declination, dip, and intensity were recorded during the year at the magnetic observatories maintained by the Survey at Cheltenham, Md.; Tucson, Ariz.; Vieques, P. R.; Sitka, Alaska, and Honolulu, Hawaii. Seismograph records were obtained at these observatories, and daily meteorological observations made in cooperation with the Weather Bureau. Special rapid-rate registration was maintained on certain term days in compliance with the plans adopted for international cooperation. Magnetic observations were made in the field at a large number of stations in the United States and in the Philippine Islands, and meridian lines were established where desired by local authorities. Vessels of the Survey are provided with instruments for making magnetic observations both at sea and on land and a large amount of valuable information is gathered in connection with the prosecution of surveys ashore and afloat.

The demand for magnetic data on the part of engineers, surveyors, and municipalities interested in local surveys or projects for improvements is a constant one. Much information of this kind is available in printed form, but much is furnished by transcripts from manuscript records.

Tide observations were made in connection with hydrographic surveys and at regular tide stations at Portland, Me.; Fort Hamilton, N. Y.; Atlantic City, N. J.; Philadelphia, Pa.; Baltimore, Md.; Fernandina, Fla.; Galveston, Tex.; San Diego and San Francisco, Cal.; Seattle, Wash.; and Juneau, Alaska. Tidal indicators were maintained at Fort Hamilton, N. Y.; at New York City; and at Reedy Island, Delaware River.

Through the cooperation of the Bureau of Lighthouses current observations were made at a number of light vessels along the Atlantic coast. Similar observations were made when practicable by the hydrographic parties of the Survey.

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INTERNATIONAL BOUNDARIES.

UNITED STATES AND CANADA BOUNDARY.

On the boundary between the United States and Canada east of the summit of the Rocky Mountains from the Red River of the North to Lake of the Woods the party engaged in topography, vista cutting, leveling, and interpolation of monument sites advanced the topography for a distance of 95 miles along the boundary; and the vista cutting for a distance of 82 miles; 102 miles of boundary were located and 155.5 miles of levels run.

The party engaged in triangulation on this portion of the boundary occupied 24 triangulation stations and completed 550 square miles of triangulation, a distance along the boundary of 87 miles. The triangulation of Lake of the Woods was completed by June 20, 1913. A base line was measured near Fort Frances, Ontario, and a rapid reconnoissance was made with a view to the extension of the triangulation as far as the mouth of Rainy River. Seventy-five monuments were set on the boundary during the season of 1912. The north and south boundary to its intersection with the boundary running southeastward was located and marked in the spring of 1913 with reference monuments. The north and south line was measured twice with an invar tape. Eleven triangulation stations were occupied in May and June, 1913. A Canadian party, to which an American surveyor was attached, was at work during the season of 1912 from the northwest angle of Lake of the Woods to the southward. The triangulation was extended down the lake for a distance of about 25 miles; reference marks were established, and a hydrographic survey of the lake along the boundary was made by the American surveyor. Work in this locality was resumed May 27, 1913, at Bear Island, Ontario, and was in progress at the close of the fiscal year.

The party working between Pigeon River and Lake of the Woods during the season of 1912 carried the triangulation and topography from Round Lake to the western end of Knife Lake, a distance of about 35 miles. Twelve topographic sheets were complete.

Work was resumed in the spring of 1913, and by June 30, 50 square miles of triangulation and 78 square miles of topography had been completed, covering a distance along the boundary of 6½ miles.

The party at work on the survey and monumenting of the northeastern boundary between Maine and New Brunswick completed the measurement of 31.5 miles of boundary with invar tape, ran 37 miles of levels, and surveyed 42.39 square miles of topography, included on six topographic sheets. A lane 30 feet in width was cut through the dense forest along this portion of the boundary. The monuments set by the commission of 1842 were reset and additional monuments were interpolated where necessary.

The party engaged in the survey of the boundary in the valley of the St. Croix River completed 18 square miles of triangulation and 2 square miles of topography included on four topographic sheets. This work was done during the season of 1912. In the latter part of June, 1913, work was resumed and marks were placed, to which that portion of the boundary formed by Monument Stream was referred. A plane-table survey was commenced at the initial monument to show in detail the shore line of Monument Stream. Work was in progress at the close of the fiscal year.

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ALASKA BOUNDARY.

During the season of 1912 the line tracing of the one hundred and forty-first meridian boundary was carried from latitude 69° 20′ to the shores of the Arctic Ocean in latitude 69° 39′, a distance of 22 miles.

In the same season the triangulation was completed from latitude 68° 54′ to the Arctic Ocean, 51 miles, and was extended eastward along the shore for 25 miles, to determine the relation of the terminal monument to the shore line.

Topography was carried northward along the meridian by one double topographic party from latitude 69° 04′ to latitude 69° 39′, a distance of 40½ miles, and was then expanded westward along the coast to longitude 141° 30′ and eastward to longitude 140° 48′. This topography takes in the natural features nearest the boundary, including Icy Reef, Beaufort Bay, and Demarcation Point to the west, and Clarence Bay to the east.

Vista cutting and stadia measurements were carried on from latitude 68° 50′ 40″ to the ocean coast, a distance of 58 miles. Another vista cutting and stadia party operated south of the Porcupine River for a distance of 33 miles, connecting with the work completed in 1911.

The final monumenting north of the Porcupine River was completed to the Arctic Ocean from latitude 68° 30′ where it terminated in 1911, a distance of 80 miles, and south of the Porcupine, over 78 miles. In all 56 monuments were placed in 1912.

The monuments were inspected and numbered from the Arctic coast to the Yukon River, the most northerly monument being No. 1. From the Arctic Ocean to the Yukon River there are 115 monuments in a distance of 344 miles, or an average of one monument to 3 miles.

The demarcation of the boundary line has therefore been completed north of the Yukon River. Between the Yukon and Mount Natazhat there remains only the inspection and numbering of the monuments, which it is expected will be completed during the present season.

In June, 1913, preparations were made for a joint inspection of the boundary monuments south of the Yukon River by an American and a Canadian surveyor, but owing to various delays work was not begun until June 27.

South of Mount Natazhat the boundary extends to the vicinity of Mount St. Elias, a distance of 84 miles in a very difficult mountainous region. A triangulation party and a topographic party were sent in 1912 to make surveys preliminary to defining the line in this region. Triangulation was carried from stations which had been established in Scolai Pass in 1909 down Scolai Creek, across country to the Chitina River, and up the Chitina River to within about 30 miles of the boundary, a distance altogether of about 90 miles. Plane-table topography was carried across the boundary from the mouth of the Canyon Creek on the Chitina, up the valley of the latter, taking in the top of the ridges on either side, and photographs were taken from which a considerable additional area can be plotted.

In May, 1913, a base line was measured, and arrangements were made for extending the triangulation up the Logan glacier. By June 1 the reconnoissance was completed to within 8 miles of the boundary, where progress was delayed by a heavy snow fall.

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A topographic party took the field in the Mount Natazhat region in April, 1913. By June 30 about 100 square miles of topography had been surveyed.

The survey and monumenting of the water boundary on Portland Canal was conducted by a Canadian party to which an American surveyor was attached. A scheme of triangulation is being extended along Portland Canal and the topography of the adjacent shores is being mapped. Permanent reference monuments are placed on both sides of the canal and these are connected with the triangulation. During the season of 1912 the triangulation was extended for a distance of about 64 miles, and 31 reference monuments were placed. Field work was resumed at the end of May, 1913, and was in progress at the close of the fiscal year.

SPECIAL SURVEYS.

Requests were received for special surveys in the following localities: West Penobscot Bay, Me.; Rockland, Me.; Piscataqua River, N. H.; Weymouth Fore River, Mass.; Nantucket Shoals, Mass.; shores of Marthas Vineyard, Mass.; Point Judith Harbor of Refuge, R. I.; East River, N. Y.; Greater and Little Peconic Bays, Long Island, N. Y.; outer and inner harbors of Delaware Breakwater, Del.; survey of grounds of Hygienic Laboratory, Washington, D. C.; location of line of Florida Avenue, Washington, D. C.; special triangulation in District of Columbia; special hydrographic examination to determine extent of pollution of water in Potomac River, Md. and Va.; Hog Island Bay, Va.; channels at entrance to Chesapeake Bay, Va.; determination of position of objects on the north shore of Hampton Roads, Va.; Sheephead Rock, N. C.; determination of position of aids to navigation in St. Johns River, Fla.; Tampa Bay, Fla.; Mississippi Delta, Miss.; Angel Island, Cal.; Yaquina Bay, Oreg.; Halibut Bank, southwest of Newport, Oreg.; Culross and Perry Islands, Alaska; Chicagof and Lisianski Straits, Alaska; Shumagin Islands and Iniskin Bay, Alaska; and determination of position of wireless stations on the Atlantic and Pacific coasts.

DANGERS TO NAVIGATION.

Dangers to navigation were discovered, investigated, or reported as follows: Rocks near shore line in Narragansett Bay, R. I.; in channel near Plum Beach Light House; near Hope Island, and in entrance to Wickford Harbor, R. I.; shoal near Beaufort Inlet, N. C., and shoaling in channel between Beaufort Inlet and Core and Bogue Sounds; reported shoal near Cape Lookout, N. C.; channels near Hog Island shoal, Narragansett Bay; shoals on coast of North Carolina and Virginia; shoals and rocks in Block Island Sound; shoal near Point Judith on which U. S. S. *Nebraska* struck; rocks in Buzzards Bay, Mass.; shoals in Key West Harbor, Fla.; reported shoal near Winter Quarter Shoal Light Vessel; reported shoal northeastward from Cape Henry; wreck on Long Reef, Fla.; reported shoals off Jupiter Inlet and off St. Lucie Island, Fla.; wreck of the *Condor* off Carolina Shoal Beach; Weymouth Fore River, Mass.; reported shoal west of the Graves Light House; reported changes in Pollock Rip

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Slue; shoal in Great Round Shoal Channel; reported shoaling in channel between Pollock Rip and Shovelful Light vessels; wreck of the *Luckenbach* in Chesapeake Bay; rock off Fish Egg Island, Alaska, on which the steamer *Curacao* grounded; rock in Tonawek Bay, Alaska, on which the *Curacao* was wrecked; rock at entrance to Coal Bay, Alaska; search for Leonard and Anderson rocks; shoals in approaches to Kuskokwim River; shoal in Port Wells, Alaska; rock near Perry Island Passage; reported rock nead Wedge Island, Clarence Strait, Alaska; reef southwest of Dall Head, Alaska; reefs near Cresto de Gallo Island, P. I.; rocks in channel running over Apo Reef, P. I.; shoals in region between Panay and Palawan, P. I.

OFFICE WORK.

The work of the Coast and Geodetic Survey office includes, besides administrative details, all operations necessary for the preparation and publication of charts, coast pilots, tide tables, notices to mariners, reports and special publications which give the results of triangulation, precise leveling, and magnetic work, except printing and binding, which is done at the Government Printing Office. These operations include the reduction and plotting of results obtained in the field, computing, drawing, engraving, lithographing, photographing, electrotyping, and chart printing. Instruments used by the field parties are repaired and in some cases constructed in the office, which has a complete equipment for mechanical work.

The proceeds of sales of charts and publications during the year amounted to $15,709.88, and miscellaneous receipts (work done for outside parties, sale of property, etc.) to $1,016.84, making a total of $16,726.72, which was duly covered into the Treasury.

OFFICE OF INSPECTOR OF HYDROGRAPHY AND TOPOGRAPHY.

The Inspector of Hydrography and Topography supervises the field work of parties on the surveying vessels and all other hydrographic and topographic work, including coast pilot work in field and office. He prepares plans for field work and instructions for the chiefs of parties and recommends the approval of estimates and changes in the personnel of vessels when necessary. He conducts the routine work relating to the shipment of seamen and makes an administrative examination of the accounts of the vessels. He reports monthly the progress of work under his direction and the status of the crews of vessels and of other employees not under civil-service classification. He also personally inspects the repairs of the surveying vessels on the Atlantic coast.

Work done in the office comprises compilation of the Coast Pilot, proof reading, correcting existing editions, and other miscellaneous details. The field work of the coast pilot party is referred to elsewhere in this report.

VESSELS AND PARTIES.

The party on the steamer *Bache* was engaged in inshore and offshore hydrography between Charleston and Savannah, including St. Andrews and Sapelo Sounds and Tybee and Port Royal entrances;

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and offshore work between Delaware and Chesapeake Bays. The *Bache* was repaired at Boston between September 26 and October 27.

The steamer *Endeavor* was at work on the hydrography of Chesapeake Bay from Kedges Strait northward; in Narragansett Bay, R. I.; and between Cowpen Island, Core Inlet, and Morehead City, N. C. Repairs to this vessel were made at Baltimore, between November 20 and January 2, and at Jersey City between May 19 and 24 and June 24 and 30.

The steamer *Hydrographer* was employed on Coast Pilot revision between Chesapeake Bay and Key West; detached hydrographic surveys on the coast of Massachusetts and on the coast of North Carolina in the region between Cowpen Island, Core Inlet, and Morehead City. The *Hydrographer* was repaired at Baltimore between December 21 and January 20 and between June 19 and 30.

The party on the schooner *Matchless* completed a survey of the Pamunkey River, Va., to the head of navigation and began a survey of the southern and eastern branches of Elizabeth River. This survey was nearly completed by the end of the fiscal year. The *Matchless* was repaired at Baltimore between July 1 and 23 and between June 26 and 30.

Wire-drag work was done in the channel between Block Island, R. I., and Montauk Point, Long Island, N. Y.; in Buzzards Bay, Mass.; at Key West, Fla.; and on the coast of Maine in the vicinity of Matinicus Island.

A resurvey of the Delaware River from the House of Correction Wharf at Trenton was completed and a survey of Newark Bay and the Hackensack and Passaic Rivers was begun.

Chart-revision work was continued, including shore-line changes, improvements and additions in vicinity of New York City; on Long Island Sound eastward from Stamford, Conn.; on the coasts of Maine and Massachusetts; and a survey was made of the dredged channel between Great and Little Peconic Bays, Long Island, N. Y. Preparations were begun at the close of the fiscal year for making a series of current observations in the Potomac River.

An officer of the Survey continued to serve in cooperation with the Maryland Shell Fish Commission and was engaged throughout the year in the preparation for publication of maps, reports, and descriptive data relating to the surveys and delineation of the oyster grounds of the State. The same officer aided the Shell Fish Commission of the State of Delaware in the preparation of a report of their work.

Information was collected for the preparation of an inside route pilot from Cape Sable, Fla., to New Orleans, La.

A hydrographic survey was begun of Piscataqua River and Great Bay, N. H.

An officer of the Survey performed the duties of inspector for the region between Narragansett Bay and Delaware Bay during the year. Information was obtained by this officer for chart corrections and notices to mariners and data relating to charts, tides, and sailing directions has been supplied to navigators and others interested. A revision was made of the shore line of Hog Island and portions of Rhode Island and Bristol Island, and of the hydrography of the channel between Hog Island and Rhode Island and in the vicinity of Hog

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Island Shoal Light. The construction of certain boats for the use of the Survey and of machinery and boilers for the same and the collection of data relating to depths in channels and harbors were among the varied duties performed by this officer whose headquarters are at the New York Custom House.

The steamer *Explorer* was employed in the survey of the entrance of the Kuskokwim River, Alaska. The *Explorer* was repaired at Seattle and at the Puget Sound Navy Yard between January 20 and the early part of April, and afterwards a radio apparatus was installed on the vessel.

The party on the steamer *Gedney* was engaged in surveys in Kasook Inlet, Sukwan Strait, Tlevak Strait, and San Christoval Channel, Alaska, and in revision work at Tacoma, Olympia, and Seattle, Wash. The vessel was repaired at Winslow, Wash., between February 24 and April 4.

The steamer *McArthur* made hydrographic surveys in Cook Inlet, of Aialik Bay, and offshore between Aialik and Resurrection Bays; at Nakat Harbor and Burnett Inlet and at Iniskin Bay, Alaska. The vessel was repaired between February 19 and April 15 at the Puget Sound Navy Yard.

The steamer *Patterson* was employed on the triangulation and topography of Clarence Strait, southeastern Alaska, and in the survey of the Shumagin Islands and Unimak Pass. During the winter the vessel was engaged in the hydrography around the island of Maui and off the west end of Molokai Island, Hawaiian Islands. Temperatures of sea water were obtained both in going to Hawaii and in returning. The *Patterson* was repaired at Seattle between July 1 and August 2 and in November and May. In the latter month a radio apparatus was installed on the vessel.

The steamer *Taku* operated in the northwestern part of Prince William Sound between Naked Island and Port Wells, and in the north arm of Simpson Bay, thence southward toward Knights Island Passage and westward from previous work to the mainland. The *Taku* was repaired at Cordova, Alaska, between April 2 and May 1.

The steamer *Yukon* was employed on the survey of Turnagain Arm, Cook Inlet, and in the approaches to the Kuskokwim River, Alaska. The *Yukon* was repaired at Seldovia between April 23 and May 10.

Revision work for the correction of charts was done at Blaine, Bellingham, Anacortes, Neah Bay, Port Angeles, Port Townsend, Richmond Beach, and Coupeville on Puget Sound.

The revision of the triangulation and topography of the island of Maui was completed and that of the island of Hawaii was begun. The work has been carried from Hilo around the northwest point of the island of Kawaihae.

An officer of the Survey continued in charge of the suboffice at San Francisco and as inspector for the coast of California. A resurvey was made under his direction of the United States immigration station on Angel Island, San Francisco Bay.

An officer acting as inspector for the coasts of Oregon, Washington, and Alaska and in charge of the office at Seattle in addition to other duties rendered valuable service in the preparation of specifications for repairs of vessels and of plans for a new launch for the

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steamer *Pathfinder*, in planning work for vessels in Alaska, and in collecting and furnishing information useful to navigators and for corrections to the charts.

PHILIPPINE ISLANDS.

An officer of the Survey detailed to duty as Director of Coast Surveys, with headquarters at Manila, has direction of all field work in the Philippine Islands. The details of this work are mentioned elsewhere in this report.

The steamers *Pathfinder*, *Fathomer*, *Romblon*, *Marinduque*, and *Research*, have been engaged in that work. Of these vessels all except the *Pathfinder* are the property of the insular government, which provides the crews and keeps the vessels in repair. The salaries of the officers and the running expenses, including outfit, are paid by the United States.

Congress having made an appropriation for extraordinary repairs to the steamer *Pathfinder* she was taken to Hongkong, arriving December 24. Extensive repairs were made, which were completed on April 8, when the vessel returned to Manila.

The *Pathfinder* encountered several typhoons during the year, the most severe of which occurred on October 16, when she was lying at Cebu. Both of her launches were dragged from their moorings and swamped. One was recovered without serious damage; the other was lost.

On November 6 the steamer *Marinduque* during a typhoon was driven on shore of a small island east of Palawan and seriously damaged, necessitating extensive repairs.

OFFICE OF INSPECTOR OF GEODETIC WORK.

The duties of inspector, conducted at the office in Washington and in the field, consist in the supervision of the work of the parties of the Survey engaged in geodetic operations in the field, the discussion and preparation for publication of the results obtained, and the investigation of scientific problems based upon such results.

The inspector assisted the International Boundary Commission by inspecting the records and computations of triangulation and the reports of the field parties engaged in the survey of the boundaries.

As one of the delegates on the part of the United States he attended the meeting of the International Geodetic Association at Hamburg, Germany.

A field inspection was made of the work of the parties engaged in triangulation in Texas and Louisiana.

An important work completed during the year is the triangulation along the one hundred and fourth meridian from the transcontinental triangulation in the vicinity of Denver, Colo., northward to the Canadian boundary, and connecting at various points with State boundaries, with the triangulation of the United States Geological Survey at one point with the triangulation of the Missouri River Commission, and with bench marks established by the United States Geological Survey, by several railroads, and by the Coast and Geodetic Survey.

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Two parties were engaged in this triangulation, which was begun May 10, 1912, and finished December 4, 1912. Two base lines, aggregating about 25 kilometers in length, were measured and 14 astronomical azimuths were observed. The scheme of this triangulation extends over 720 miles and covers an area of about 17,000 square miles. Eighty-two primary and 19 secondary stations were occupied and 133 geographic positions were determined. The reconnoissance and signal building for this work were completed in the summer of 1911.

Another event of great importance was the completion of the triangulation along the ninety-eighth meridian from Alice, Tex., to the Mexican boundary, a distance of 150 miles and covering an area of about 1,300 square miles. Thirty-four stations were occupied in the main scheme and 72 geographic positions were determined. In the month of April 15 primary stations were occupied. This is the greatest number ever occupied in one month by a single party in this country and has probably not been equaled elsewhere. The reconnoisance and signal building were conducted by a separate party.

This triangulation connects with the coast triangulation at Point Isabel, Tex., and it will finally be connected with the primary triangulation of Mexico, which extends across that country from the Pacific Ocean to the Rio Grande approximately along the ninety-eighth meridian. In connection with this work a determination was made of the difference of longitude between Austin and Donna, Tex.

A line of precise levels was completed from San Francisco, Cal., along the line of the Southern Pacific Railway to Brigham, Utah. The levels are connected with tidal bench marks at San Francisco and with precise level bench marks previously established at Brigham.

The fact that the Geodetic Commissions of Mexico and Canada have adopted the same datum and spheroid used in trigonometric surveys in the United States gives to this datum an international character. Its designation has accordingly been changed from United States standard datum to the North American datum.

Other work done during the year was the revision of triangulation and the determination of geographic positions of aids to navigation, the determination of the positions of wireless towers along the Atlantic and Pacific coasts, the telegraphic determination of difference of longitude between Omaha, Nebr., and five stations on the one hundred and fourth meridian, and the beginning of a secondary triangulation along the coast of Washington and of a line of levels between Crookston, Minn., and Butte, Mont., and the preparation for remeasurement of the El Paso base in Colorado.

Six new publications relating to geodetic work were issued during the year. These are listed under the head of "Publications" in another portion of this report. The manuscript of these publications was nearly all prepared before the beginning of the fiscal year, 1913.

The manuscript of a report on the triangulation of the west coast of Florida was sent to the printer before the close of the year. A publication on the precise level net in the United States and a report on the triangulation of the coast of Texas were nearly completed.

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OFFICE OF INSPECTOR OF MAGNETIC WORK.

The duties of this officer are to plan magnetic work to be carried out in the United States and outlying territory under the jurisdiction of the United States, to inspect magnetic work in the field, and at magnetic observatories; to recommend changes in the personnel and salaries of magnetic observers; to recommend the purchase or construction of new magnetic instruments or alterations of old ones when required, or the designing of new ones; to recommend changes in the design of instruments or methods of observing to secure better results or save time; and to supervise the planning and construction of buildings for magnetic observations.

In October the Cheltenham Observatory was inspected and in March the Porto Rico Observatory was visited and inspected under instructions from the Superintendent. All other inspection work during the year was performed at the office by the current examinations of the records and reports from chiefs of magnetic parties and others engaged in magnetic work. Detailed instructions were prepared for the guidance of magnetic observers in the execution of the field and observatory work and computations.

The magnetic observatories at Cheltenham, Md.; Tucson, Ariz.; Honolulu, Hawaii; Sitka, Alaska; and Vieques, P. R., were in operation throughout the year. Seismographs were kept in operation and meteorological observations were made at all of the observatories.

Special rapid-rate registration was carried out on specified-term days, each month in conformity with requests for international cooperation in connection with the Australasian Antarctic expedition engaged in magnetic observational work in the Antarctic regions. At the request of the Batavia, Java, magnetic observatory special rapid-rate registration was carried out at specified-term hours during the month of October for the purpose of securing additional data for the study of the rate of propagation of magnetic disturbances.

All of the instruments used in field magnetic work during the year were standardized at the Cheltenham Observatory and special observations and comparisons were made for determining the constants of various instruments.

Further instruction was given at the Cheltenham Observatory to an observer preparing to go with the Crocker land expedition and to a newly appointed magnetic observer of the Coast and Geodetic Survey.

Necessary repairs and alterations were made to the observatory buildings where required.

MAGNETIC WORK ON LAND.

The magnetic elements (declination, dip, and horizontal intensity) were determined at 245 stations. The stations were distributed, in accordance with most urgent needs, over 28 States and Territories and outlying territory under the jurisdiction of the United States, and one foreign country, as shown in the table following. Forty-eight "repeat" stations were occupied during the year for the purpose of obtaining observational data for maintaining adequate information of the secular change of the magnetic elements, especially of the magnetic declination. The magnetic work in the Philippines, mentioned in my last report, was concluded in January, 1913.

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SUMMARY OF RESULTS ON LAND.

States.	Localities.	Stations.	Old localities reoccupied.	Declination results.	Dip results.	Intensity results.
Alabama	4	4	1	4	4	4
Alaska	17	17	1	17	2	2
Arizona	1	1	1	2	2	2
Arkansas	18	18	1	18	18	18
Colorado	3	3	1	3	3	3
Delaware	5	5	1	5	5	5
Georgia	2	2	0	2	2	2
Iowa	10	10	3	10	10	10
Kansas	1	1	1	1	1	1
Kentucky	21	22	3	22	22	22
Maryland	1	1	1	7	5	5
Massachusetts	4	4	1	4	4	4
Michigan	2	2	0	2	2	2
Mississippi	6	6	0	6	6	6
Missouri	16	16	1	16	16	16
Nebraska	5	5	2	5	5	5
New Jersey	7	7	0	7	7	7
North Carolina	6	6	1	6	6	6
Ohio	3	3	1	3	3	3
Oklahoma	14	14	3	14	14	14
Pennsylvania	8	10	3	10	10	10
Philippine Islands	20	23	14	23	23	23
South Dakota	3	3	1	3	3	3
Tennessee	9	9	0	9	9	9
Texas	30	31	2	31	31	31
Virginia	18	18	2	18	14	14
Washington	1	1	1	1	1	1
West Virginia	1	1	0	1	1	1
British Columbia	1	1	1	1	2	2
Yukon Territory	1	1	1	1	0	0
Total	238	245	48	252	231	231

The magnetic work done at sea by the vessels of the Survey was, as in past years, incidental to the regular surveying duties upon which they were engaged, and the magnetic observations were made when the vessels were en route to or from their working grounds, or where opportunity offered on the working grounds. The sea results are not so numerous as in past years, due largely to the fact that the ships have recently covered little new territory. The following table shows (approximately) the amount of magnetic work carried out on board ship during the year, several of the vessels under instructions for magnetic work not having yet reported the work done during the first half of this calendar year:

SUMMARY OF RESULTS AT SEA.

Vessels.	General region.	Results from swings.			Declination results from course observations.
		Declination.	Dip.	Intensity.	
Hydrographer	Atlantic coast	5	0	0	0
Patterson	Pacific coast	1	1	1	0
Gedney	do		1	0	0
McArthur	do	1	0	0	0
Explorer	do	1	1	1	0
Taku	do	2	0	0	0
Total		10	3	2	0

All of the vessels of the service that are suitable for it are instructed during each season to make such magnetic observations, espe-

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cially the magnetic declination, as there is opportunity for doing, either at sea or on land, where the weather conditions and the requirements of their regular duties permit. The *Patterson* and *Explorer* on the Pacific coast are supplied with sea-dip circles for determination of dip and intensity at sea, and they are also equipped with magnetometers for magnetic work on land. The *Bache* has not had a dip circle during the year. One of the needles of the *Bache's* dip circle was broken over a year ago and since that time this office has been experimenting in the construction of dip needles for this instrument, with the intention of ultimately being able to make suitable dip needles here and thus avoid the necessity of having to send to Europe for them with the consequent long delays in getting them.

APPROPRIATIONS AND DISBURSEMENTS.

The total appropriation made by Congress in the sundry civil act for the fiscal year ending June 30, 1913, for the Coast and Geodetic Survey was $1,022,720, divided as follows:

Field expenses	$314,400
Repairs and maintenance of vessels	40,000
Extraordinary repairs of steamer *Pathfinder*	20,000
Officers and men, vessels	245,000
Pay of field officers	160,200
Pay of office force	193,120
Office expenses	50,000
Total	1,022,720

The deficiency act for 1913 contained two items for the Coast and Geodetic Survey, namely:

Repairs and maintenance of vessels:	
For installation of wireless apparatus on three vessels	$9,000
For rewiring the Coast and Geodetic Survey buildings	4,300
Total	13,300

The statement of disbursements required by law to be made annually to Congress and published as a separate document gives an account of the names and number of employees of different classes employed on the work, the amount of their salary or compensation, the length of time employed, to whom payments were made under the different items of appropriation and on what account, and the balances left of the amounts appropriated for the fiscal year.

PUBLICATIONS.

The following publications of the Coast and Geodetic Survey were received from the printer during the fiscal year 1913:

Results of observations made at the Coast and Geodetic Survey magnetic observatory at Vieques, P. R., 1909–10; by Daniel L. Hazard, 1912. 10 charts. 94 pp. 4to.

Same: Sitka, Alaska, 1909–10; by Daniel L. Hazard. 21 charts. 96 pp. 4to.

Same: Tucson, Ariz., 1909–10; by Daniel L. Hazard. 5 charts. 2 text fig. 59 pp. 4to.

Catalogue of charts, coast pilots, and tide tables, 1912. 86 text fig. 228 pp. 4to.

Effect of topography and isostatic compensation upon intensity of gravity, 2d paper; by William Bowie, 1912. (Special publication No. 12.) 5 maps in pocket. 28 pp. 4to.

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Geodetic operations in the United States, 1909–12, report to 17th conference of International Geodetic Association (Hamburg, Germany, Sept., 1912, with list of geodetic publications by Coast and Geodetic Survey since Jan. 1, 1909); by O. H. Tittmann, 1912. 3 pl. 18 pp. 4to.

Texas-California arc of primary triangulation; by William Bowie, 1912. (Special publication No. 11.) 2 pl. 6 pp. of pl. 141 pp. 4to.

Survey of oyster bars, description of boundaries and landmarks, and report of work of Coast and Geodetic Survey in cooperation with Bureau of Fisheries and Maryland Shell Fish Commission; by C. C. Yates, 1912 [each large 8vo., with large map]:

Talbot County, Md. 250 pp.

Dorchester County, Md. 180 pp.

Statement of expenditures in Coast and Geodetic Survey, fiscal year 1912. Jan. 16, 1913. (H. Doc. 1271.) 14 pp. 8vo.

Inside route pilot, New York to Key West, 1912 [by Herbert C. Graves and W. E. Parker]. 8 maps in pocket. 62 pp. large 8vo.

Annual report of Superintendent, fiscal year 1912. Portfolio of 9 maps. 1 diag. 106 pp. 8vo.

Same (H. Doc. 966).

Inland waterway, Atlantic coast. 2 pp. 8vo.

Regulations and instructions for government of Coast and Geodetic Survey, 1913. 83 pp. 8vo.

California-Washington arc of primary triangulation; by A. L. Baldwin, 1913. (Special publication No. 13.) 7 text fig. 78 pp. 4to.

Determination of time, longitude, latitude, and azimuth; by William Bowie. 5th edition, 1913. (Special publication No. 14.) 8 pl. 18 pp. of pl. 177 pp. 4to.

United States coast pilot, Atlantic coast: pts. 1, 2, St. Croix River to Cape Ann [supplement to 3d edition]. May 27, 1913. 5 l. large 8vo.

Same: pt. 3, Cape Ann to Point Judith [supplement to 3d edition]. May 20, 1913. 4 l. large 8vo.

Same: pt. 4, Point Judith to New York [supplement to 5th edition]. Apr. 22, 1913. 8 l. large 8vo.

Same: pt. 5, New York to Chesapeake Bay entrance [supplement to 4th edition]. May 12, 1913. 7 l. large 8vo.

Same: pt. 6, Chesapeake Bay and tributaries [compiled by Edwin H. Tillman and John Ross]. 4th edition [revised by Herbert C. Graves]. 1913. 2 maps. 5 text fig. 162 pp. large 8vo.

Same: pt. 8, Gulf of Mexico from Key West to Rio Grande [supplement to 3d edition]. May 12, 1913. 9 l. large 8vo.

United States coast pilot, Pacific coast: California, Oregon, and Washington [supplement to 2d edition]. May 12, 1913. 8 l. large 8vo.

Same: Alaska, pt. 1, Dixon Entrance to Yakutat Bay, with inland passage from Juan de Fuca Strait to Dixon Entrance. 5th edition. 9 pl. 4 text fig. [Reprint.] large 8vo.

Same, supplement. May 20, 1913. 12 l. large 8vo.

A number of other publications were in press or in course of preparation for publication at the close of the year.

The total cost of printing and binding for the Coast and Geodetic Survey, including blank forms and miscellaneous job printing for the year, payable from the appropriation for printing and binding for the Department of Commerce, was $26.526.52.

ECONOMY AND EFFICIENCY.

A large amount of the time of officers and employees of the Coast and Geodetic Survey was devoted during the year to the preparation of statistical and other information called for by the President's Commission on Economy and Efficiency. An analysis was made of the expenditures of the Survey and special estimates were prepared in a form requested by the commission. An itemized statement was made of the expenditures for transportation and a number of special reports were prepared.

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SPECIAL DUTY.

International Geodetic Association.—The Superintendent continued to supervise the operations of the observatories maintained by the International Geodetic Association at Gaithersburg, Md., and Ukiah, Cal.; and the Superintendent and the inspector of geodetic work, as delegates on the part of the United States, attended the meeting of the association at Hamburg, Germany, in October, 1912.

Board on life-saving appliances.—The Superintendent is chairman of the board appointed by the Secretary of the Treasury to examine and report upon life-saving appliances.

Mississippi River Commission.—An officer of the Survey, in addition to other duties, has continued to serve as a member of the Mississippi River Commission.

Maryland Shell Fish Commission.—An officer detailed for duty with the Maryland Shell Fish Commission continued on duty in charge of office work and the preparation of maps, reports, and publications. Assistance was rendered by the same officer to the Oyster Survey Commission of the State of Delaware without expense to the Federal Government.

Two officers of the Survey were detailed to represent the Department of Commerce at the conference of port authorities. Both of these officers were in attendance at the meeting in New York and one of them also attended the meetings of the conference at Boston, Philadelphia, and Baltimore.

ASSISTANCE RENDERED IN SAVING LIFE OR PROPERTY.

On October 7 the steamer *Hydrographer*, on her way from Pollock Rip to Boston, sighted a stranded four-masted schooner just south of the Marconi Towers, Cape Cod, and went to her assistance. She was loaded to 21 feet with coal. The *Hydrographer* at first alone and then with the assistance of the U. S. S. *Cyrus W. Field* managed to move her a little, but was unable to dislodge her. Through the *Field's* wireless apparatus the revenue cutter *Gresham* was notified, and with two life-saving crews standing by the schooner the *Hydrographer* proceeded on her way to Boston. The *Gresham* was expected in time for the high water of that evening.

The *Hydrographer* also rendered assistance to the schooner *Sallie Purnell Beswick*, which went aground in North Landing River, N. C.

The Pacific Coast Steamship Co.'s steamer *Curacao*, which ran aground on a bowlder spit near Fish Egg Island, Alaska, was assisted in getting afloat by the Coast and Geodetic Survey steamer *Gedney* and launch *Cosmos*. Afterwards when the *Curacao* was wrecked in Tonawek Bay the *Gedney* took off the passengers and crew and conveyed them to Ketchikan, 140 miles distant, the nearest port of call for steamships.

A very severe typhoon passed over the southern part of Samar, Leyte, Cebu, and the northern part of Negros on October 15 and 16. Hundreds of lives were lost and shipping and property were destroyed in its path. The steamer *Pathfinder* rode out the storm in safety in Cebu Harbor, but 17 smaller merchant steamers foundered or were beached. Two of the *Pathfinder's* launches, although anchored in a protected part of the harbor, were swamped. One of

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these was afterwards recovered. Great praise was expressed by the public for the heroic services rendered by a volunteer boat's crew from the *Pathfinder* in going to the rescue of shipwrecked sailors during the height of the storm, although they knew they could not return to their own vessel but would have to remain on shore until the storm abated. Assistance was also rendered the steamer *Lizarraga* which was sighted in distress and she was towed to a protected anchorage.

The officers of the steamer *Research* aided in extinguishing what might have been a serious fire on a new tugboat in the dock on Engineers Island, Manila Bay. For this service the officers of the *Research* were thanked by the Director of Navigation of the Philippine government.

DETAILS OF FIELD OPERATIONS.

Atlantic Coast.

MAINE.

[E. B. Latham.]

Summary of results.—Triangulation: 185 square miles of area covered, 22 signal poles erected, 13 old stations recovered, 7 stations searched for but not found, 23 spires, lighthouses, etc., identified, 23 stations in main scheme and 19 in supplemental scheme occupied for horizontal measures, 88 geographic positions determined. Topography: 94 square miles of area revised and changes noted but work incomplete, 6 topographic sheets partly revised.

On July 1 chart revision work was being done between Ipswich, Mass., and York, Me. Revision work between Hampton Beach, N. H., and York, Me., was continued until September 30, when work between York and Portland Head was begun. The work of inspecting and noting changes in the topography and search for old triangulation stations was first attended to, leaving the collection of plans, local surveys, and data relating to new roads and railroads until the time when the weather would be unfavorable for outside operations. In December the compilation and plotting of the revised sheets south of York were completed.

The triangulation station Mount Independence north of Portland was recovered and marked.

During the calendar year 1912 the revision of the topography was completed from York, Me., to the road just north of and parallel with Saco River, excepting the towns of Kennebunkport, Cape Porpoise, Biddeford, and Saco.

Chart revision between York and Portland Head Light was continued until April 9, by which time the work needed was nearly completed.

MAINE, MASSACHUSETTS, CONNECTICUT, RHODE ISLAND, NEW YORK, AND FLORIDA.

[N. H. Heck.]

Summary of results.—Triangulation: 444.5 square miles of area covered, 13 signal poles erected, 30 stations occupied for horizontal measures, 52 geographic positions determined. Leveling: 17 elevations determined by leveling, 3 miles of levels run. Hydrography: 169 square miles of area dragged, 416.8 miles run with wire drag, 18,621 angles measured, 561 soundings, 5 tide stations established, 5 hydrographic sheets finished.

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At the beginning of the fiscal year the wire-drag party was engaged in work in Block Island Sound. Owing to lack of shelter from the wind, strong tidal currents, the necessity of using distant signals, frequent haze, and the large number of lobster pots which had to be removed before the drag could be used, the conditions here were found unfavorable for rapid progress.

The area dragged in Block Island Sound consisted of a ridge with comparatively shoal water connecting Block Island and Long Island, surrounded by deeper water on both sides. The general width of the area in a north and south direction between the 10-fathom curves is from 4 to 7 miles. An area of 46 square miles was dragged between July 2 and September 24. A considerable number of uncharted bowlders and sand ridges were located. The location of the deepest channel was determined, and a dangerous rock was located.

Under instructions of August 10 a survey was made of an uncharted shoal in Block Island Sound to the westward of Point Judith, R. I., on which the battleship *Nebraska* had struck on August 8.

A careful examination was made with the wire drag of the locality mentioned, and a least depth of 21 feet was found on detached bowlders. An extensive bowlder-strewn area was developed.

This shoal lies 1⅛ miles from the north shore of Block Island Sound and 4½ miles west from Point Judith.

Tides were observed at two stations on Block Island. Soundings were made in Trims Pond, Block Island, which has been connected with Great Salt Pond since the original survey.

Changes in certain topographic features on Block Island were determined by the party.

Triangulation was executed over an area of 84 square miles to determine the position of additional objects to be used as signals in Block Island Sound and of other objects useful as aids to navigation.

Between September 13 and November 20 the party was engaged in the northern end of Buzzards Bay, with headquarters at Marion, Mass.

An especial effort was made to determine the safest channel leading to the Cape Cod Canal. An area of 28 square miles was covered. The number of soundings taken, a large per cent of which represent uncharted depths on bowlders or ledges, indicates the necessity for this work.

A ridge of bowlders, with depths from 24 to 27 feet, was found to the southeastward of Cormorant Ledge extending for about 2 miles at right angles to the general direction of the bay. In the eastern part of the bay extensive bowlder-strewn areas were developed with depths from 14 to 20 feet.

Six stations were occupied and 11 objects determined by triangulation for use as signals, 3 of which are prominent water towers. The triangulation covered an area of 45 square miles.

Five old tidal stations were visited, at 3 of which the old bench marks were recovered. Eight new bench marks were established.

Between January 4 and April 20 a wire-drag survey was made of the channels at the entrance of the harbor of Key West, Fla.

The object of this work was to cover the areas not previously dragged to a depth of 30 feet, to find the greatest safe depth that can

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be taken through each of the seven possible channels to Key West, not including the main ship channel or the west channel, and to find the safe depths that can be taken over the inner reefs at various points. A long drag, averaging 2,700 feet, was used throughout the season, and a large number of shoals were found and dragged over.

The weather during the season was unfavorable for rapid progress. Thirty-one square miles of area were covered, however, and 316 soundings were obtained, about 80 per cent of which were made on uncharted shoals or shoals on which a less depth was found than had been indicated on the charts. A new triangulation was executed, many of the old stations having been destroyed by hurricanes. All of the beacons, including the range beacons for entering the main ship channel, were determined, as well as many prominent objects of a permanent nature at Key West. The stations were all carefully marked. Some verification work was done to ascertain the correctness of topographic details on the chart.

Considerable improvement has been made in the methods of work and equipment used in the drag work as the result of practical experience, and a complete description embodying these improvements is in course of preparation for publication.

On June 10 wire-drag work was begun near Matinicus, on the coast of Maine, and was in progress at the close of the fiscal year.

MASSACHUSETTS.

[EARL F. CHURCH.]

In November the necessary observations were made for connecting the triangulation of the Coast and Geodetic Survey with that of the Corps of Engineers, United States Army, at Newburyport, Mass.

Preliminary to this work copies of triangulation data were obtained from the office of the United States Engineers at Boston and from the Harbor and Land Commission of Massachusetts concerning certain triangulation stations at Newburyport.

Four points of the United States Engineers' survey of 1911 were joined with three stations of the Coast and Geodetic Survey.

The location was determined by triangulation of Plum Island Lighthouse and of Black Rock (Butler's Toothpick) Beacon.

The Salisbury Beach wharf and range lights are located by the Engineers' survey with which the Coast and Geodetic Survey triangulation was connected, but sextant angles were taken to give approximate determination of Salisbury Beach range lights and of the point on Salisbury Beach wharf, where the tide staff is located. The jetties at the mouth of the river are well determined by the Engineers' survey.

In formation was gathered in regard to changes in topographic details at the northwestern point of Plum Island and of the shore line and adjacent buildings along Salisbury Beach.

A tide staff was erected at Salisbury Beach, levels were run between the tide staff and several bench marks, and tide observations were begun by observers hired for the purpose.

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MASSACHUSETTS, VIRGINIA, AND NORTH CAROLINA.

[PAUL C. WHITNEY, Commanding Steamer *Hydrographer*.]

SUMMARY OF RESULTS.—Reconnoissance: Length of scheme, 48 miles. Base lines: 1,541.3 meters in length. Triangulation: 163 square miles of area covered, 84 signal poles erected, 3 observing tripods and scaffolds built (average height 30 feet), 63 stations in main scheme occupied for horizontal measures. 130 geographic positions determined. Topography: 27 square miles of area surveyed, 103.3 miles of general coast line surveyed, 6 miles of roads, 4 topographic sheets finished. Hydrography: 77 square miles of area covered, 662 miles run while sounding, 4,860 positions determined, 28,794 soundings made, 13 tide stations established, 13 hydrographic sheets finished.

Between September 24 and December 2 the steamer *Hydrographer* was engaged in chart revision work on the coast of Massachusetts. The work done includes a survey of the channel around Peddocks Island, into the mouth of Weymouth Fore River, Boston Harbor; search for reported shoal west of the Graves Lighthouse; hydrography of Cape Cod Bay, between Minot Ledge and Sandwich, Mass., survey of changes in Barnstable Harbor; resurvey of entrance to Wellfleet Harbor; survey of reported changes in Pollock Rip Slue; resurvey of channel between Handkerchief and Shovelful Shoals, and search for a reported shoal in Great Round Shoal Channel.

On October 7 the *Hydrographer* rendered assistance to a stranded schooner south of the Marconi Towers, Cape Cod.

September 5, 1912, the commanding officer of the *Hydrographer* was directed to make a hydrographic survey of the channel from Weymouth Fore River, around Pig Rock and westward of Peddocks Island to Nantucket Sound; make a thorough examination of the vicinity of the 5-fathom spot shown on chart 357, reported in November, 1911, by Capt. Giles of the steamship *Everett* in the following position, "Graves gas and bell buoy bears SE. by E. ½ E., Graves Lighthouse bears about S. by W."; examine 5-fathom spot about 2 miles off North Scituate Beach; examine the 8½ and 9 fathom spots 2½ miles east of Scituate Harbor and the 7-fathom spot about 1 mile south-southwest; also the 3¾-fathom sounding 1 mile off New Inlet and the 7-fathom sounding off South River; examine the limits of 6-fathom curve north of Howland Ledge off Manomet Point and from Center Hill Point to Sagamore Beach; fill in soundings between North Scituate to Sagamore Beach; make hydrographic survey of entrance to Wellfleet Harbor; and survey entrance to Barnstable Harbor.

On September 24, 1912, the Hydrographic Office of the Navy Department transmitted to the Coast and Geodetic Survey copy of a letter from Mr. W. E. I. Stiles of the Branch Hydrographic Office, Norfolk, Va., stating that he had received reports from masters of vessels of shoaling on the southern side of Pollock Rip Channel midway between Pollock Rip and Shovelful light vessels.

Under instructions of September 26, 1912, the *Hydrographer* made a careful examination of this channel, but found no indication of an 18-foot shoal spot in the position reported. An examination of an 18-foot sounding shown on the chart just to the southwestward developed a least depth of 14 feet, and it appears probable that this is the shoal that the *Kershaw* struck and not some new shoal to the

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northward. Many vessels were observed passing dangerously close to this shoal, the position of which was determined under date of September 24, 1912. The lighthouse inspector at Boston had reported that Shovelful Shoal was extending to the southward and Handkerchief Shoal to the eastward and that the passage between the shoals was so nearly closed as to be unsafe without local knowledge, and he recommended that the channel be closed to navigation. Subsequently the Bureau of Lighthouses ordered the removal of the buoys marking this channel.

The alleged shoaling in the channel to the Pollock Rip gas and whistling buoy reported by the master of the *Juniata* was investigated, but no evidence of such shoaling was discovered. A least depth of 24 feet, reduced, was found close to the buoy and one of 21 feet just inside the buoy.

A course laid 300 feet off the outer buoy will not put a vessel in anything like 18 feet of water. The master of the *Juniata* stated that when the vessel struck the buoys were to the eastward of their subsequent position, and it is probable that she touched the extreme western end of the broken part of Pollock Rip instead of an obstruction in the channel.

In January, while on her way to the coast of North Carolina, the *Hydrographer* determined the position of the wreck *Julia Luckenbach* in Chesapeake Bay, and in North Landing River assistance was given to the schooner *Sallie Purnell Beswick*, which had run aground. The new channel from Pamlico Sound to Core Sound, past Harbor Island Bar Light was sounded out.

Hydrography executed in conjunction with the steamer *Endeavor* included a resurvey of the land and water areas lying between meridian 76° 35′ and a line from Bells Point and the ocean beach passing through Cowpen Island, except the southern extremity of Cape Lookout and part of Back Sound. A scheme of tertiary triangulation was executed, forming a loop around Harkers Island and extending to Cowpen Island and Bells Point as a base for future operations to the eastward in Core Sound. The topography and hydrography of Core Creek were also included in the work of this season.

In cooperation with the steamer *Endeavor* search was made for a reported shoal 18 miles southwest of Cape Lookout. It was found that no shoal exists in the locality indicated.

In the vicinity of Neuse River hydrographic work was done to determine the present location of shoals, spits, and bars, and the positions of all aids to navigation were determined from Wilkinsons Point down, including Adams Creek and Bay River to Bayboro. A new tertiary triangulation was executed joining the work by Assistant Ritter in 1911 and running down the Neuse River to its mouth and connecting in Bay River with the triangulation of 1909 by the Corps of Engineers, United States Army. From the western end of this a traverse line was run to Bayboro locating the day marks in the dredged channel. At Oriental a survey was made to show the bulkhead and the depths behind it. The triangulation of the United States Engineers in Adams Creek was connected with that by this party and a check base was measured for the purpose of verification. A topographic survey of Vandemere, N. C., a new town on Bay River, was made.

This work was completed on June 14.

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MASSACHUSETTS, RHODE ISLAND, SOUTH CAROLINA, AND GEORGIA.

[ISAAC WINSTON.]

SUMMARY OF RESULTS.—Triangulation: 176 square miles of area covered, 8 beacons built (heights 25 and 40 feet), 41 stations in supplemental scheme occupied for horizontal measures, 24 geographic positions determined.

Between August 26 and November 1 a revision was made of the triangulation of Narragansett Bay, R. I.

Nearly all of the old stations along the western passage in Narragansett Bay, between Narragansett Pier and Wickford, were readily recovered so as to be available for use by the hydrographic party on the Coast and Geodetic Survey steamer *Endeavor* upon arrival on September 10.

Valuable information in regard to surveys and dredging in progress in Narraganset Bay and vicinity was obtained from the United States Engineers office at Newport.

The stations of the triangulation by the United States Engineers were visited in company with a United States assistant engineer, and notes were made showing their condition. Preliminary arrangements were made with a view to permanently marking those stations at which only temporary marks had been placed.

A blue print showing a hydrographic survey of Wickford Harbor and approaches including a dredged channel in the harbor was furnished by the United States Engineers.

The search for old triangulation stations was extended over Narragansett Bay, Providence River, Hope Bay, and Sakonnet River; new wharves were located, and the positions of prominent objects useful as hydrographic signals or aids to navigation were determined. Several tidal bench marks were recovered and additional bench marks were established.

During the season one chart agency at Providence and two at Newport were inspected. Thirty-four Coast and Geodetic Survey triangulation stations and 42 triangulation stations established by the United States Engineers were recovered, and supplementary marks were established and supplementary descriptions in the case of the Coast and Geodetic Survey stations were prepared. Two new Coast and Geodetic Survey triangulation stations were established, and 26 were found to have been destroyed. Ten stations of the triangulation by the United States Engineers were found to have been destroyed. The locations of 26 lighthouses and 1 beacon were reported unchanged. One lighthouse and 3 beacons were found to have been destroyed. The positions of 2 lighthouses and 4 beacons were determined. Nine prominent objects, previously determined, were recovered. Ten such objects were found to have been destroyed. Twenty-nine such objects were determined in position.

The office of the United States Engineers at Boston was visited and useful information was obtained in regard to surveys by the United States Engineers in the vicinity of Newburyport, Mass.

Work was closed for the season on November 16.

The chart agencies at Providence and Newport, R I., were inspected during the progress of field work in the localities mentioned.

The determination of the positions of buoys and beacons and of prominent objects useful as aids to navigation in the vicinity of

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Savannah, Ga., which had been begun by Mr. R. R. Lukens was continued after March 26 by Mr. Isaac Winston.

Information in regard to beacons and buoys was obtained from the lighthouse inspector at Charleston, and in regard to the triangulation in the vicinity data were obtained from the office of the United States Engineers at Savannah. Three old triangulation stations of the Coast and Geodetic Survey, viz, Fort Jackson 3, South Base, and Proctor were recovered, and from these a scheme of triangulation was extended sufficient to determine the points required. The geographic positions of 10 prominent objects were determined in addition to completing the scheme of triangulation begun by Mr. Lukens. Four of the triangulation stations used by the United States Engineers were recovered and marked. Blue prints showing the condition of the wharves at Savannah were obtained and other data collected for use in the correction of the charts.

In April the chart agency of the Coast and Geodetic Survey at Savannah, Ga., was inspected, the number of Charts, Tide Tables, and Coast Pilots checked, and out of date or damaged publications returned to the office at Washington.

Between April 13 and June 12 the triangulation of Port Royal Sound and North Edisto River was revised. A number of beacons were erected and their positions determined for the use of the Lighthouse Service in locating aids to navigation.

A beacon 40 feet in height was erected on Hilton Head south of the entrance to Port Royal Sound, and one on Capers Island north of the entrance. The beacon on Hilton Head was erected over the triangulation station Hilton established in 1900. The triangulation station on Capers Island established in 1900 has been destroyed. The beacon was erected on the southwest end of the island as it exists at present, and its geographic position was determined from three old stations. This determination places the beacon about 1 mile outside the shore line shown on the charts, corresponding to a similar change in the position of the channel over the bar since the survey was made. In connection with this work five of the old triangulation stations were recovered, two found to have been destroyed, and one new station was established. In the vicinity of Helena Sound two beacons 40 feet high were erected, one on the south shore of Tripp Inlet south of the entrance and one on the south end of Edisto Island north of the entrance. One beacon 25 feet in height was erected on Marsh Island in Coosaw River. The old triangulation station on Tripp Inlet has been destroyed and the beacon is built over a new station, Tripp 2. On Edisto Island the beacon was built over station Point, established in 1902. The beacon on Marsh Island was built over a new station, Marsh.

In this work four old triangulation stations were established and three stations were found to have been destroyed.

In the vicinity of North Edisto River three beacons 25 feet in height were constructed. No triangulation stations were available near two of these points, and their geographic positions remain to be determined.

Much information was obtained concerning the condition of other triangulation stations in this region.

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MASSACHUSETTS AND NEW YORK.

[T. L. WARNER.]

SUMMARY OF RESULTS.—Triangulation: 12 signal poles erected, 25 stations occupied for horizontal measures in supplemental scheme, 26 geographic positions determined.

In January and February the positions of two wireless telegraph towers in Boston, Mass., one at 131 State Street and the other at the corner of Washington and Sumner Streets, were determined, and also that of a small wireless telegraph pole at 126 State Street. At Nantucket, Mass., the location of the wireless masts at Siasconset was determined.

At Coney Island, N. Y., the position of the Marconi wireless mast was located, and a similar determination was made of the wireless tower at Sayville and of the wireless mast at Sagaponack, both on Long Island.

A number of aids to navigation in the vicinity of Great Peconic Bay, Long Island, were determined in position for the Bureau of Lighthouses and also a number of points for use in the survey of a new channel between Robins Island and Cow Neck.

In this work four old triangulation stations were recovered and observed upon and two of them occupied. Five new stations were occupied, observations of horizontal angles made, and signals erected. Seven other points were determined as tertiary triangulation stations but not occupied, and four other points were sufficiently well determined for the purposes of a hydrographic survey.

CONNECTICUT AND NEW YORK.

[H. P. RITTER.]

SUMMARY OF RESULTS.—Topography (chart revision): 6 square miles of area surveyed, 18 miles of general coast line, 10 miles of roads, 1¼ topographic sheets finished. Hydrography: 0.5 square mile of area covered, 14.5 miles run while sounding, 139 positions determined, 657 soundings, 2 tide stations established, 3 bench marks established, 12 buoys located, 1 hydrographic sheet finished.

During the first half of the fiscal year the topographic revision of Chart 269 (Stamford Harbor to Little Captain Island) was completed, and the revision of Chart 270 (Little Captain Island to Rye Neck) begun. About one-quarter of the field work for the revision of that chart was completed by the end of December.

The officer engaged on this work was called on to appear as an expert witness before the superior court of the State of New York in regard to certain topographic surveys by the Coast and Geodetic Survey.

He also was temporarily in charge of the office of the inspector at New York for short periods on several occasions.

Chart revision work was continued until the latter part of June. In April an examination was made of a reported rock in East River, N. Y.

A hydrographic survey was made to locate the newly dredged channel between Little and Great Peconic Bays. In connection with this work a tide staff was erected and tide observations were recorded

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between May 12 and June 12. The positions of the buoys in the channel were determined. This work was completed June 15 and arrangements were made for beginning a series of current observations in the Potomac River in cooperation with certain investigations undertaken by the United States Public Health Service relating to the pollution of the river water by sewage.

RHODE ISLAND.

[H. A. SERAN.]

In August, 1912, the positions of five post lights temporarily placed on the breakwater at Point Judith, R. I., were determined by triangulation, using the line Point Judith Lighthouse to North Light, Block Island, as a base.

The breakwater was at that time being repaired and all the beacons were post lights placed there temporarily. All of these were determined in position as well as the wireless tower, and an angle required by the wire drag party was observed.

RHODE ISLAND, MARYLAND, AND NORTH CAROLINA.

[J. B. BOUTELLE, Commanding Steamer *Endeavor*.]

SUMMARY OF RESULTS.—Triangulation: 191 square miles of area covered, 10 old stations recovered, 9 new stations selected, 35 signals built, 22 stations occupied for horizontal measures, 68 geographic positions determined. Topography: 24.5 square miles of area surveyed, 90.5 miles of general coast, 70 miles of shore line of creeks, 1 topographic sheet finished. Hydrography: 161.7 square miles of area covered, 2,025.4 miles run while sounding, 11,468 positions determined, 142,720 soundings, 6 tide stations established, 4 hydrographic sheets finished.

Between July 1 and August 28 the party on the steamer *Endeavor* continued hydrographic work in Chesapeake Bay in the area from Kedges Strait to Barren Island, the sounding lines extending from the shore to beyond the 4-fathom curve. Lines were run approximately parallel with the shore line and about 100 meters apart and crossed at every 400 meters.

No considerable changes were found to have occurred since the previous surveys.

Between September 11 and November 15 the party on the steamer *Endeavor* was engaged in the revision of the hydrography of Narragansett Bay, R. I.

Signals were erected and determined in position over the area extending through the western passage from Whale Rock Lighthouse to Hope Island. Tide gauges were established at West Jamestown, Dutch Harbor, and at Wickford and connected with the old Coast and Geodetic Survey bench mark at Jamestown and with one another. Various new wharves, a small portion of the shore line, and a number of hydrographic signals were determined with the plane table.

Sounding lines were run north and south approximately 100 meters apart and crossed at intervals of about 200 meters, and in places where further examination was found necessary lines were run 50 meters or a less distance apart.

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Considerable change in the depths and contours was found in the southern end of the Western Passage. Numerous uncharted rocks were located near the shore line and a ledge with a depth of 23 feet on it was found near the middle of the channel near Plum Beach Lighthouse.

On the northwest side of Hope Island is a very dangerous rock, with from 6 to 8 feet of water on it, on the eastern side of the channel. Several vessels have struck this rock. A recently discovered rock with 8 feet of water on it was located on the north side of the entrance to Wickford Harbor south of White Rock Beacon. This rock has been marked by a red spar buoy.

The steamer *Endeavor* began work on the coast of North Carolina in the vicinity of Beaufort on January 11. After several old stations had been found and signals erected over the area covered by the survey, the triangulation was extended to the western end of Harker's Island, up North River and into Bogue Sound to a point 1 or 2 miles west of Morehead City. Topography and hydrography were then begun over the same area, the topography consisting mainly of shore line. Very little change was found to have taken place since the former surveys except in the vicinity of Beaufort Inlet and the channels leading into that inlet. One shoal was formed, an extension of Shark Shoal on the east side of the channel between Morehead City and the inlet having but 5 feet upon it where the surveys by the United States Engineers in 1908–9 show about 21 feet. On the south side of the channel leading from the inlet toward Back and Core Sounds there was a channel of 12 to 14 feet in 1908 which has since filled up to 7 feet, at low water. The currents in the vicinity of the inlet are very strong and the sea breaks heavily over these shoals and often across the channels causing frequent changes both in depth and location. During January and February a dredge was at work on the inlet bar making a 20-foot channel over it. Soundings taken April 21 and 22, 1913, show a least depth of 17 feet over this bar.

The dredged channels leading from Beaufort Harbor were sounded as far as their junction at Russell Creek Light, and thence continued into Core Creek by the party on the steamer *Hydrographer*. All lights and range beacons were determined in position.

On April 17 the *Endeavor* and the *Hydrographer* made a search for a 2-fathom shoal reported 6 miles west-southwest of Cape Lookout Shoals buoy. Lines of soundings were run over an area of 2 miles or more in the supposed location of the shoal and sufficiently to entirely disprove the existence of such an obstruction. Cape Lookout Shoals buoy and Cape Lookout Lightship were determined in position, the latter being found 3 miles east and one-half mile north of its charted position. Work was closed in this vicinity on April 24.

On May 27 work was begun at Point Judith, R. I., for a survey of the Harbor of Refuge and vicinity. The necessary triangulation points having been established, the shore line topography was run by plane table on a scale of 1/5,000 from Point Judith on the east to Rocky Point on the west of the breakwater. A tide gauge was set on the inside of the breakwater near Point Judith and connected with a bench mark of the United States Engineers and the Coast and Geodetic Survey.

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Sounding lines were run outside of the breakwater 100 meters apart for about 1 mile south and around Point Judith on the east to Rock Point on the west. Inside the breakwater the lines of soundings were run 50 meters apart, special attention being given to the character of the bottom.

On June 19 work was resumed on the resurvey of Narragansett Bay. Search for old stations and signal building were begun but the work was interrupted for the purpose of making certain necessary repairs to the vessel.

RHODE ISLAND AND NEW YORK.

[E. F. DICKINS.]

SUMMARY OF RESULTS.—Topography: 1 square mile of area surveyed, 5 miles of general coast line surveyed, 1 topographic sheet finished. Hydrography: 1½ square miles of area covered, 65 miles run while sounding. 747 positions determined, 1,398 soundings made, 1 tidal station established, 1 hydrographic sheet finished.

An officer of the Survey has been engaged during the year on inspection duty for the region included between Narragansett and Delaware Bays. He was temporarily detached in July to make a survey in the vicinity of Hog Island, R. I.

The duties of the inspector are to obtain information for the correction of Charts, Notices to Mariners, and other publications of the Survey; to furnish information in regard to charts, sailing directions, and tides; to receive and ship instruments for the use of field parties; to keep in touch with the maritime public and navigators and to find out their needs.

In July a hydrographic resurvey was made of the channel between Hog Island, Bristol Island, and Rhode Island in Narragansett Bay, including Hog Island Shoal, on which the U. S. S. *Louisiana* had recently grounded, and which was reported to have extended to the southward since the last survey. The shore line of the adjacent portions of the islands was rerun and the whole area sounded over. The results of the resurvey establish the fact that an extension of Hog Island Shoal to the southward has taken place, and in view of this condition recommendation was made that the buoy marking this obstruction be moved to the southern extremity of the shoal.

NEW YORK, NEW JERSEY, AND PENNSYLVANIA.

[C. M. CADE.]

In January determinations were made of the positions of wireless telegraph stations and prominent objects useful as aids to navigation, as follows:

In New York City: Marconi Wireless Station on Wanamaker Building determined by triangulation, Telefunken Wireless Station on tower of Trinity Building determined by triangulation, two towers on Bush Terminal Co.'s Building determined by triangulation, and the former station of the United Wireless Co., at 42 Broadway, determined approximately. In Philadelphia: Two towers on Wanamaker Building determined topographically. In Chester, Pa., a tall chimney below Marcus Hook determined by triangulation.

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In Camden, N. J., the United Wireless Station (abandoned) on tall water tank at New York Ship Yards was determined approximately. At Cape May, N. J., the position of the Marconi Wireless Station was determined by triangulation.

NEW YORK, NEW JERSEY, PENNSYLVANIA, DELAWARE, MARYLAND, VIRGINIA, GEORGIA, FLORIDA, ALABAMA, MISSISSIPPI, AND LOUISIANA.

[W. E. PARKER.]

SUMMARY OF RESULTS.—Triangulation: 25 square miles of area covered, 39 stations in supplemental scheme occupied for horizontal measures, 54 geographic positions determined.

Between October 30 and November 9, with the permission of the Bureau of Lighthouses, apparatus for making current observations was installed on eight light vessels between Fire Island Light, off New York Entrance, and Winter Quarter Shoal, off the coast of Virginia. Observers on each of the vessels visited were instructed in the method of making the observations required.

Between January 13 and February 17 the positions of wireless telegraph stations were determined by triangulation at Norfolk and Virginia Beach, Va., Savannah, Ga., and at Jacksonville, Palm Beach, Knights Key, and Tampa, Fla. At Fernandina, Fla., the automatic tide gauge was repaired and the tide staff connected by leveling with bench marks in the town.

Between February 18 and March 15 a trigonometric determination was made of the positions of aids to navigation in Tampa Bay and of such natural and artificial objects on the shores of the bay as may be useful to navigators or to members of the Lighthouse Service in placing buoys.

On March 16 an examination of the Gulf coast was begun in order to obtain data for an Inside Route Pilot of the waters to the westward of Key West, Fla. The coast harbors and inland passages were traversed between Tampa, Fla., and New Orleans, La. The route was covered thoroughly and all places that could be entered safely with the launch, that served to transport the party, were examined.

A second inspection was made of the tide gauge at Fernandina, Fla., which had been accidentally damaged.

Field work was closed on May 8.

NEW JERSEY, PENNSYLVANIA, DELAWARE, VIRGINIA, AND NORTH CAROLINA.

[J. R. BENTON.]

STATIONS OCCUPIED.—*Delaware:* Clayton (or Smyrna), Delaware City, Middletown, Newcastle, and Seaford. *New Jersey:* Berlin, Elmer, Moorestown, Swedesboro, Williamstown, Woodbury, and Woodstown. *North Carolina:* Enfield, Franklinton, Littleton, Raleigh, Wake Forest, and Whitakers. *Pennsylvania:* Avondale (or Kennett Square) and Media.

During the season between August 2 and September 11 and between June 16 and 30 magnetic observations were made at the stations named, all of which were new stations except Seaford, Del., and Raleigh, N. C. The stations were permanently marked. At Swedesboro observations were made over a triangulation station. At Moorestown, N. J., a meridian line was run and temporarily marked.

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NEW JERSEY AND PENNSYLVANIA.

[STEHMAN FORNEY.]

SUMMARY OF RESULTS.—Reconnoissance: 14 square miles of area covered, 198 lines of intervisibility determined, 99 points selected for scheme. Triangulation: 14 square miles of area covered, 93 signal poles erected, 78 stations occupied for horizontal measures, 221 geographic positions determined. Topography: 22.75 square miles of area surveyed, 57.5 miles of shore line of rivers, 15.5 miles of shore line of creeks, 1.75 miles of shore line of ponds, 109.25 miles of roads, railroads, and trolley lines, 2 topographic sheets finished. Hydrography: 2 tide stations established.

The survey of the Delaware River from House of Correction, Pa., to Trenton, N. J., which was in progress at the beginning of the fiscal year was completed on February 28. The work done includes the necessary tertiary triangulation and the topography on a scale of 1/40,000, included on two topographic sheets.

Having closed work on the Delaware River this party began a resurvey of Newark Bay, N. J., on March 28.

Three of the triangulation stations used in the triangulation of greater New York were recovered, viz, Bogart, Summerfield M. E. Church, and Bergen Point, and from these a scheme of tertiary triangulation was completed from Bergen Point up Newark Bay into the entrance of the Passaic and Hackensack Rivers. The topographic resurvey at Bergen Point was begun.

DELAWARE, MARYLAND, VIRGINIA, SOUTH CAROLINA, GEORGIA, AND FLORIDA.

[W. C. HODGKINS, Commanding Steamer *Bache*.]

SUMMARY OF RESULTS.—Triangulation: 136 square miles of area covered, 17 signal poles erected, 21 stations occupied for horizontal measures, 15 geographic positions determined. Magnetic work: 4 sea stations at which ship was completely swung. Topography: 43 miles of general coast line surveyed, 3 topographic sheets finished. Hydrography: 3,677 square miles of area sounded, 2,500 miles run while sounding, 5,289 positions determined, 32,795 soundings, 2 tide stations established, 4 hydrographic sheets finished.

On July 1, 1912, the steamer *Bache* was at Brunswick, Ga., engaged in the offshore hydrography needed to supply deficiencies in the charts of the coast from St. Andrew Sound on the south to Sapelo Island on the north with some further work to the northward and eastward off Tybee and Port Royal entrances. The hydrography of that region was continued until August 17, when the *Bache* proceeded to Norfolk, Va., taking soundings between Port Royal and Charleston entrances.

An examination of the vessel at Norfolk showed the necessity for extensive repairs which were made at Boston in September and October.

The next work done by the *Bache* was an examination of the area to the northeastward of Winter Quarter Shoal light vessel, in which dangers were reported to exist. A tide staff was established on Delaware Breakwater and an observer placed in charge. Two floating signals were moored on a line extending northward from the light vessel and with that vessel these were used as signals for locating the positions of the soundings. It was found that the reported dangers

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do not exist in the area examined and in question. Work in that region was closed December 7 and the vessel then began an examination at Chesapeake entrance for a shoal lump reported by the Virginia Pilots' Association as existing about 3 miles to the northward and eastward of Cape Henry. The examination of the locality proved that no such shoal exists.

Offshore hydrography was then resumed on the coast of North and South Carolina.

On January 4 the *Bache* proceeded to the Savannah River, where field work was begun by setting up a tide staff at Fort Screven wharf, Tybee Island, and connecting it with the established bench marks.

From that time until March 12 the party was engaged in running lines of soundings generally in an east and west direction and from 2 to 5 miles apart to develop the area off the coast of Georgia, within which few soundings had previously been obtained, although the depths are not great, and lying northward of Sapelo Sound and outside of the belt of closely developed hydrography.

Beginning at points about 5 miles offshore, it was generally found necessary to run lines from 20 to 30 miles long and only occasionally near the eastern end of a line did the depth reach 20 fathoms.

On March 12 the *Bache* sailed from Charleston to the position of the wreck of the British steamship *Lugano*, stranded on Long Reef, Fla., to the southward of Fowey Rocks, and to survey the north end of the Florida Reefs off Miami. The position of the wreck of the *Lugano* was determined on March 15.

The hydrography of the north end of Florida Reefs was completed on May 26 in spite of unfavorable weather conditions. For this work it was necessary to determine by triangulation a few additional stations and to check the positions of some of the beacons which had been destroyed by hurricanes and afterwards rebuilt. The shore line of the outer coast from Cape Florida northward to latitude 25° 50′ was resurveyed by plane table while the hydrography was in progress.

After closing work off Miami the *Bache* at once proceeded to the vicinity of Jupiter Inlet where search was made for reported shoals off that inlet and off St. Lucie Island. The reports of dangers in these localities were found to be erroneous.

The position of a conspicuous stand pipe at Hobe Sound was determined by triangulation.

The regular work of the party on the coast of Georgia and South Carolina was resumed on April 9 and continued until June 14, by which date the hydrography within the limits assigned to the vicinity of the shoals off Cape Romain was completed. Additional work of triangulation in Ossabaw Sound was also done to fix the position of a sea coast signal on the north end of Ossabaw Island.

Work was closed June 15 and the vessel proceeded to Boston for repairs.

MARYLAND.

[George Hartnell and Samuel G. Townsend.]

At the magnetic observatory at Cheltenham, Md., the recording instruments were kept in continuous operation throughout the year. The absolute observations for declination, horizontal intensity, and

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dip were made as usual. Time from sun observations was taken at convenient intervals. Special observations were made for determining the moment of inertia of magnetic No. 26 for the comparison of earth inductors, to determine effect of adjustment, and to place the inductor in the meridian.

The seismograph was in continuous operation except for a delay of a few days for clock repairs. Some necessary repairs were made to the observatory buildings.

VIRGINIA.

[O. W. FERGUSON, Commanding Schooner *Matchless*.]

SUMMARY OF RESULTS.—Reconnoissance: 55 square miles of area covered, 405 lines of intervisibility determined, 155 points selected for scheme. Base lines: 3, secondary, measured. Triangulation: 55 square miles of area covered, 154 signal piles erected, 74 observing scaffolds and tripods built (with an average height of 6 feet), 162 stations occupied for horizontal measures, 8 old stations of United States Engineers recovered, 162 geographic positions determined. Leveling: 22 elevations determined by leveling, 17.7 miles of levels run. Azimuth: 1 station occupied for observations of azimuth on 1 night. Topography: 61.5 square miles of area surveyed, 118.3 miles of shore line of rivers, 76.4 miles of creeks, 134.2 miles of roads and railroads, 4 topographic sheets finished. Hydrography: 16.3 square miles of area sounded, 331.9 miles run while sounding, 3,063 positions determined, 14,867 soundings, 10 tide stations established, 5 current stations occupied, 5 hydrographic sheets finished.

During the first half of the fiscal year, after the completion of repairs to the vessel at Baltimore, the schooner *Matchless* was employed on the survey of the Pamunkey River, Va., this work including triangulation, topography, and hydrography.

The triangulation was begun a few miles above Westpoint at stations Creek and Gas and carried to Northbury Landing. Above Northbury Landing a meander line was run to 5 miles above New Castle at the head of navigation.

Points for the topography were located by sextant angles where, on account of the dense undergrowth, the plane table could not be used. The limits of marsh and high ground were located; also all roads, railroads, creeks, sloughs, fences, and buildings near the river. The topography was completed to the limits of the survey.

The hydrography of the river was completed to the head of the survey 5 miles above New Castle, all important features being thoroughly developed.

Tide observations were made at Gloucester Point, Morgans Wharf, Westpoint, Lester Manor, White House, New Castle, and Carters Landing, Northbury Landing, and tidal bench marks were established.

Current observations were made on three days.

Magnetic declination was observed at four stations, viz, Westpoint, Lester Manor, Northbury Landing, at a station above New Castle Bridge, and at another below that bridge.

The survey of the Pamunkey River was afterwards completed to the head of navigation 57 miles above Westpoint.

Some levels were run in Richmond to connect the tidal bench marks with a permanent bench mark of the Coast and Geodetic Survey.

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The hydrographic survey of the south branch of Elizabeth River, Va., from the naval magazine to the Chesapeake and Albemarle Canal lock was the next work undertaken. This survey was completed by April 5. In the course of this work a line of levels 12 miles in length was run to connect the various tidal bench marks in this locality, and tide observations were made during the progress of the survey.

The survey of the eastern branch of Elizabeth River, including the triangulation, topography, and hydrography, was nearly completed at the close of the year.

The hydrographic survey was carried into all creeks available for boat navigation.

Field work was temporarily suspended in June and the *Matchless* was taken to Baltimore for repairs.

VIRGINIA AND NORTH CAROLINA.

[H. C. GRAVES, Commanding Steamer *Hydrographer*.]

SUMMARY OF RESULTS.—Triangulation: 2 stations occupied for horizontal measures. Magnetic work: 5 sea stations occupied for magnetic declination. Topography: 1 square mile of area covered, 9.25 miles of general coast line run. Hydrography: 1,689 soundings made.

From July 1 to August 13 the party on the steamer *Hydrographer* was engaged in coast pilot work on the coasts of North Carolina and Virginia for the revision of Coast Pilot, Part VII, from Cape Henry to Key West. Hydrographic examinations were made at Winyah Bay, Cape Fear River, Beaufort Harbor, and the intervening coast. A topographic and hydrographic survey was made of Lookout Bight, N. C. Coast pilot work was done on the sounds and tributaries between Beaufort, N. C., and Norfolk, Va. Three uncharted shoals were located and a number of lighthouses and buoys in these waters were determined in position.

The ship was swung at 32 headings to determine compass deviation at 5 points along the coast.

VIRGINIA, KENTUCKY, TENNESSEE, AND ARKANSAS.

[DON C. SOWERS.]

STATIONS OCCUPIED.—*Arkansas:* Arkadelphia, Arkansas City, Ashdown, Brinkley, Eldorado, Fordyce, Hamburg, Hampton, Hot Springs, Lake City, Lewisville, Magnolia, Malvern, Nashville, Prescott, Stuttgart, Varner, and Washington. *Kentucky:* Albany, Alexandria, Bedford, Burkesville, Burlington, Carrollton, Falmouth, Greenup, Hodgenville, Independence, Maysville, Morgantown, Mount Olivet, Mount Vernon, Newcastle, Nicholasville, Tompkinsville, Vanceburg, Warsaw, Williamsburg, and Winchester. *Tennessee:* Byrdstown, Carthage, Celina, Dover, Gainesboro, Humboldt, Lebanon, Livingston, and Sneedville. *Virginia:* Gloucester, Heathville, Independence, Isle of Wight, King William, King and Queen, Lancaster, Lynchburg, Mathews, Montross, Saluda, Tappahannock, and Warsaw.

Between July 1 and November 30 magnetic observations were made at the above-named stations in Arkansas, Kentucky, Virginia, and Tennessee.

Five old stations were occupied. All but six of the stations occupied were marked by stone posts with brass plates set in the top. A

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few were lettered U. S. C. & G. S. 1912. In most cases the posts were set so as to project 2 or 3 inches above the surface of the ground.

The average cost per station, including the observer's salary, was $24.75.

NORTH CAROLINA.

[H. A. SERAN.]

Under instructions dated February 6 determinations were made by triangulation of the positions of 13 permanent beacons or range lights on Cape Fear River from the mouth of the river to Reeves Point.

A scheme of triangulation was carried up Cape Fear River as far as Reeves Point. In this scheme the stations established and marked by the Corps of Engineers, United States Army, were used whenever practicable. Two new stations were established.

The position of the wreck of the *Condor* off Carolina Shoal Beach was determined, and various changes in topographic details were noted for the correction of the charts.

Information concerning tidal bench marks was obtained from the United States Engineers' office at Wilmington. A blue print showing the route of the Wilmington, Brunswick & Southern R. R. from Navassa to Southport was furnished by Mr. Z. W. Whitehead of Wilmington, N. C., the builder of the road. The position of the shore end of the 300-foot terminal dock at Southport under construction by that road was determined.

GEORGIA.

[R. R. LUKENS.]

The location of aids to navigation from Warsaw Sound northward was begun February 12. A reconnoissance was made, old stations recovered, and signals erected and the occupation of stations begun by February 24. This work was completed and the revision of the triangulation of the upper Savannah River begun on March 10.

The old triangulation station on Fort Oglethorpe was not recovered. A new station was established close to the old location. The line "Proctor" to "R. R. Draw" was used as a base, and a scheme laid out to connect with the wireless tower at Savannah and also with several stations established by the Corps of Engineers, United States Army. Signals were erected and five stations were occupied when work was closed in accordance with instructions.

Two beacons were erected at the mouth of Warsaw Sound for use by the officers of the Bureau of Lighthouses in determining the positions of buoys off the sound.

The positions of the new lights at the mouth of the Savannah River were determined.

GEORGIA AND FLORIDA.

[C. M. CADE.]

SUMMARY OF RESULTS.—Base lines: 1 secondary traverse 3 miles in length measured. Triangulation: 10 signal poles erected, 6 permanent beacons erected, 1 observing tripod and scaffold built and 4 repaired (average height 16 feet), 51 stations in main scheme occupied for horizontal measures. 72 geographic positions determined.

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Between February 10 and May 31 the geographic positions of a number of aids to navigation and permanent objects on the shores of the St. Johns River were determined, using the triangulation of the United States Engineers, as adjusted to the datum of the Coast and Geodetic Survey. A hired launch was used for the transportation of the party. Many of the old stations were found standing, so that little signal building was required. In all, there were determined in position 32 pile lights and day marks, 14 permanent structures carrying lights, and 13 objects on shore, such as water tanks, chimneys, houses, etc., that will probably be available for many years.

The stations along the St. Johns River were marked by iron pipes driven into the ground.

After the completion of this work the determination of positions of aids to navigation and prominent objects in St. Catherines Sound, Ga., was undertaken. For buoy work off St. Catherines three large tripod signals, built by the steamer *Bache*, were determined in position by means of a traverse line 3 miles in length.

The next work undertaken was the determination of points for Sapelo Bar. An old station of the Coast and Geodetic Survey was recovered and marked close to a signal erected by the party on the steamer *Bache* to serve as the northern object. The quarantine station off the north end of Blackbeard Island, or a signal erected by the *Bache* on the northeast point, is available for use as the center object. A third signal 2.25 miles to the southward was erected and determined.

St. Andrews Sound was the next point visited. Here two signals were built and determined for use in locating buoys, Little Cumberland Island Lighthouse forming the third point. Four three-pile day marks in the sound were also determined.

At St. Simons Sound use was made of two signals of the United States Engineers. On Jekyl Island a signal which had been used as a transit station was boarded up, concreted, and marked for use in locating buoys on the bar. St. Simons Light may be used as the center object. A new signal was built and determined on the south point of Postells Creek on St. Simons Island, and three lights in St. Simons Sound were determined.

GEORGIA, ALABAMA, MISSISSIPPI, AND ARIZONA.

[OSCAR H. GAARDEN.]

STATIONS OCCUPIED.—*Alabama:* Eutaw,* Haynesville,* Mobile,* and Prattsville.* *Arizona:* Tucson. *Georgia:* Dawson,* Georgetown,* and Vienna. *Mississippi:* Collins,* Hattiesburg,* Lucedale,* New Augusta,* Paulding, and Raleigh.*

Between July 1 and August 12 magnetic observations were made at the stations mentioned by the observer named. Meridian lines were established at the stations marked with asterisks.

From August 12 to November 1 Mr. Gaarden was at the magnetic observatory at Tucson, Ariz., engaged in bringing up to date the accumulated records and in instructing in his duties the new observer placed in charge of that observatory.

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LOUISIANA.

[J. H. PETERS.]

SUMMARY OF RESULTS.—Triangulation: 692 square miles of area covered, 32 signal poles erected, 29 observing tripods and scaffolds built, 33 stations occupied for horizontal measures, 8 stations occupied for vertical measures, 106 geographic positions determined, 5 elevations determined trigonometrically. In January the positions of 5 radio stations along the Gulf coast were determined by triangulation.

Between February 26 and May 30 a revision was made of the triangulation of Atchafalaya, Cote Blanche, and Vermilion Bays and to determine the geographic position of Timbalier Light.

Owing to the impracticability of recovering a sufficient number of the old points it was found necessary to lay out an entirely new scheme of triangulation throughout this region.

Beginning with the line "S. W. Reef"—"Belle Isle 1999," with "Deer Island 1855" reference mark as the third point the triangulation was extended eastward one figure to Point Au Fer and thence westward seven figures through Atchafayala, East Cote Blanche, West Cote Blanche, and Vermilion Bays to Southwest Pass and the mouth of the Vermilion River. Ten supplementary figures were constructed to control the small bays and bayous adjacent to the main scheme.

Of the previous triangulation only one station, in addition to the three previously mentioned, was recovered and in that case the station mark had been moved so as to make its precise original location uncertain. This was station Cote Blanche 2, 1890.

It was necessary to build tripods of an average height of 20 feet at every station in the scheme at which observations were taken. Stations and reference points located in marshy ground were marked by piles driven in the ground and capped with a drain pipe and the intervening space filled with cement. A brass disk was placed to indicate the center of the station. The mark extends about 2 feet above the ground.

During the progress of the work connection was made with stations established by the Corps of Engineers, United States Army, and with those of a private survey adjacent to Atchafalaya Bay.

Most of the old triangulation stations were found to have been destroyed by the receding of the shore line.

Thirteen stations are known to have been destroyed, 5 others were searched for but not found, 17 new stations were established in the main scheme, 15 supplementary stations were established and 70 additional geographic positions were determined.

The positions of several aids to navigation were determined and notes were furnished in regard to changes in shore line and depths for use in correcting the charts of the localities covered.

TEXAS.

[E. H. PAGENHART.]

During the period between February 6 and May 6 a scheme of tertiary triangulation was completed between Isabel, Tex., and Baffins Bay, Tex.

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In this work as many of the old stations as practicable were recovered and marked, new stations supplementary to the old work were established where necessary to reach all parts of the area covered, and to connect with the stations established in 1912 south of Baffins Bay. A small scheme was carried from old stations in the vicinity of Isabel north along the mainland and the off-lying islands as far as triangulation station Avoca 2. From this point the scheme spans the Laguna, which is about 5 miles wide, and extends northward to a connection with stations Salt Murdock, Griffin 2, and Shells 2 (Trueblood, 1912).

Work was next begun in Topo Bay and the observing was carried up the mainland to station Salt and thence down Padre Island to the station Nouvest. An extra station, New, was established to strengthen the scheme. Old station Avoca was not recovered and Avoca 2 marked by the 1912 party was used. The old stations recovered were Cameron, Fox, Colorado, Rifle, Lomalto, and Topo. Of these, Cameron and Topo had been remarked in 1905. The others were remarked. The old stations known to have been destroyed are Snipe, Armadillo, Cat, Pelican, Bonnet, Coyote, Black Hill, and probably Avoca and Indian. The new stations, Nouvest, Buoy, Gun, and Gap, established on Padre Island were marked only by timbers or planks set about 4 feet in the sand and projecting about 3 feet.

TEXAS, MISSOURI, AND OKLAHOMA.

[FRANK NEUMANN.]

STATIONS OCCUPIED.—*Missouri:* Charleston.* Doniphan, Hillsboro, New Madrid, St. Louis, Springfield,* and Waynesville. *Oklahoma:* Altus,* Durant,* Frederick, Hobart, Hugo, Idabel, Madill, Mangum, Mountain Park, Norman, Pauls Valley, Sulphur, Taloga, and Vinita. *Texas:* Angleton, Austin, Bay City, Bastrop, Beeville,* Brenham, Brownwood, Bryan, Burnet,* Cold Spring,* Comanche, Columbus,* Floresville, Giddings,* Glen Rose,* Goldthwaite, Hamilton,* Hemphill,* Huntsville,* Kountze, Linden,* Lockhart, Newton, Rockwall,* Refugio, Richmond, San Augustine, Seguin, Sinton, and Woodville.*

The foregoing magnetic stations were occupied during the period from July 1 to November 15.

Meridian lines were established at the stations marked with asterisks.

At each station a complete set of magnetic observations were made and the latitude and longitude determined approximately.

Charleston and Springfield, Mo.; Pauls Valley, Mangum, and Vinita, Okla.; and Austin and Beeville in Texas, were repeat stations.

INTERIOR STATES.

MONTANA, NORTH DAKOTA, SOUTH DAKOTA, AND WYOMING.

[E. H. PAGENHART.]

SUMMARY OF RESULTS.—Reconnoissance: Length of scheme 50 miles, 650 square miles of area covered, 19 lines of intervisibility determined, 44 points selected for scheme. Base lines, primary, length of, 10,600 meters. Triangulation: 8,158 square miles of area covered, 40 signal poles erected, 10 observing signals and scaffolds built (heights from 3 to 60 feet), 80 stations in main

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scheme and 8 in supplemental scheme occupied for horizontal measures, 56 stations occupied for vertical measures, 99 geographic positions determined, 63 elevations determined trigonometrically. These statistics include some work done in the spring of 1912.

The party engaged on the triangulation along the one hundred and fourth meridian from the Canadian boundary to the Black Hills had completed the section from North East Base to Marmon, a distance of about 40 miles, by June 30, 1912. During this period the Ambrose Base was measured and 12 stations, two of which were azimuth stations, were occupied.

The remaining portion of the triangulation, from Marmon to station Laird, a distance of 290 miles, was continued between July 1 and December 3 to a junction at the figure Crow-Cambria-Alkali-Inyankara-Laird, with the triangulation by party working northward from the thirty-ninth parallel, in Colorado.

Azimuth observations were made at 7 stations, and the position of the Bowman longitude station was determined. Connection with other surveys was made at eight points.

Most of the triangulation stations were occupied at night.

Double-zenith distances were measured over all lines in the main scheme, with one exception. Nonreciprocal observations were made over three lines.

COLORADO, MONTANA, NEBRASKA, NORTH DAKOTA, SOUTH DAKOTA, AND WYOMING.

[GEORGE D. COWIE and HARRY A. SERAN.]

SUMMARY OF RESULTS.—Longitude: 5 longitude stations occupied.

Between August 29 and November 10 two cooperating parties determined the difference of longitude between Omaha, Nebr., and the following places: Mondak, Mont., Bowman, N. Dak., Provo, S. Dak., Wheatland, Wyo., and Watkins, Colo. The Coast and Geodetic Survey longitude station of 1907 on the Omaha High School grounds was used and it was connected by triangulation with the 1869 to 1882 land survey station, the new Omaha Hill School, and with prominent landmarks in the vicinity.

COLORADO, WYOMING, SOUTH DAKOTA, AND TEXAS.

[C. V. HODGSON.]

SUMMARY OF RESULTS.—Reconnoissance: 16 lines of intervisibility determined, 4 points selected for scheme, base lines; primary, length of, 14,559 meters. Triangulation: 10,505 square miles of area covered, 77 stations in main scheme and 12 in supplemental scheme occupied for horizontal measures, 79 stations occupied for vertical measures, 142 geographic positions determined, 142 elevations determined trigonometrically. Leveling: 9 miles of levels run. Latitude, longitude, and azimuth work: 1 station for determination of longitude by exchange of telegraphic signals occupied on 3 nights. 11 stations occupied for observations of azimuth, on 14 nights. These statistics include work done in May and June, 1912.

At the beginning of the fiscal year the triangulation along the southern part of the one hundred and fourth meridian arc from the thirty-ninth parallel near Colorado Springs, Colo., to the Canadian

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boundary had been extended southward from Guernsey, Wyo., to Cheyenne, Wyo. Work was continued after that date until its final completion on November 23. The weather conditions during the greater part of the season were unfavorable for rapid progress. Fog in the mountains and haze and smoke in the valleys greatly lessened the time available for observing.

At the south end of the work two of the reconnoissance lines were found to be obstructed, necessitating a change in the figures and a reconnoissance for new stations. The first entailed the reconnoissance for and occupation of one new station (Russell) and the reoccupation of one station for the new lines; but the second obstructed line, that from Morrison to Bison, made necessary the breaking up of the southernmost quadrilateral and a three-sided central-point figure, the establishment of three new stations, the reoccupation of two stations for new lines, and the substitution of the line Pikes Peak-Divide for the line Pikes Peak-Bison as a line common to the previous primary triangulation and the one hundred and fourth meridian work.

A second observing party under Mr. C. M. Cade was organized for work at the north end of the scheme, without waiting for the completion of the work at the southern end. Observing at the north end was not completed until October 4.

During the period from October 1 to 8 a primary base line was measured at Provo, S. Dak., and azimuth was observed on two nights. From that time until the close of the season two separate observing parties were maintained.

On November 14 a junction was effected with the work of the party under Assistant E. H. Pagenhart working between the Canadian boundary and Guernsey, Wyo., the last stations occupied by the southern party being Crow and Cambria. Four stations near Cheyenne were reoccupied between November 20 and 23.

Primary azimuths were measured during the season at stations Ragged, Twin, Dewey, Boulder, Willow, Watkins, and Provo.

Between February 24 and June 1 a primary triangulation was made from Alice, Tex., to the Rio Grande and along the Rio Grande from the ninety-eighth meridian to Point Isabel. Connection was made with four reference points of the survey by the United States and Mexican Boundary Commission, but on account of disturbed conditions in Mexico the connection with the triangulation along the ninety-eighth meridian by the Mexican Geodetic Commission was not completed.

During the period mentioned 34 primary stations were occupied and 3 azimuths were measured, or an average of more than 12 stations per month. During the month of April 15 stations were occupied.

The reconnoissance for this work was executed and the signals erected by a separate party.

This triangulation is 150 miles in length and covers approximately 1,800 square miles.

Notwithstanding the fact that the climatic and other conditions were most favorable for rapid progress the completion of so extensive a scheme of triangulation in so short a time is worthy of remark as an achievement probably never before equaled in work of this character.

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On the completion of the necessary observations in the triangulation a determination was made of the telegraphic longitude at triangulation station Donna (Texas), using Austin as a base station. Mr. George D. Cowie cooperated in this work. Signals were exchanged on the nights of May 30, May 31, and June 1 with satisfactory results, and work was closed for the season.

COLORADO, NORTH DAKOTA, SOUTH DAKOTA, TEXAS, AND WYOMING.

[J. S. BILBY.]

SUMMARY OF RESULTS.—Reconnoissance: Length of scheme 175 miles, 1,450 square miles of area covered, 80 lines of intervisibility determined, 36 points selected for main and 4 for supplemental scheme. Base lines: 1 (14,600 meters in length) prepared for measurement. Triangulation: 42 signal poles erected, 34 observing tripods and scaffolds built with average height of 43.02 feet, and 40 with heights from 4 to 60 feet; 24 superstructures, average height 24 feet; 2 light stands, average height 10 feet.

The two parties organized in April, 1912, to build the signals and prepare for the observing parties the stations located by reconnoissance during the season of 1911 between the thirty-ninth parallel in the vicinity of Colorado Springs and the Canadian border, had made the following progress by June 30. The northern party had reached Sentinel Butte, N. Dak., and had prepared a base-line site and assisted in measuring the base at Ambrose, N. Dak. During the same period the southern party had completed signal building from Manville, Wyo., southward to the vicinity of Colorado Springs.

Work was continued after July 1 and by August 28 all of the stations had been prepared and the Provo base made ready for tape measurement. Stands or signals were built at 40 stations and each station marked.

From September 1 to the close of the season in November the signal-building party cooperated with one of the parties engaged in triangulation so as to permit the maintenance of a double observing party. This work is noticed under another head.

Between January 11 and June 10 a reconnoissance was made for a primary triangulation to extend from the vicinity of Alice, Tex., to the Rio Grande opposite the northern end of the scheme of triangulation extended along the ninety-eighth meridian by the Mexican Government, and also for a primary triangulation extending down the Rio Grande from the approximate location of the ninety-eighth meridian to Point Isabel, Tex. At the latter point provision was made for a connection with the primary triangulation in the vicinity of Point Isabel. The necessary signals were erected for the use of observing parties, and provision made for a connection with the scheme of triangulation, and also with four monuments of the topographic survey of the Rio Grande made by the International Boundary Commission, United States and Mexico.

The line Alice West Base-Wood with East Base as the third point was selected as the base from which to start the work, and the scheme follows generally the line of the railroad to the Rio Grande and Point Isabel. At the latter place connections were made with West Base-Arista, East Base being used for the third point. Unsettled conditions in Mexico prevented the connection with the triangulation

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along the ninety-eighth meridian done by the Geodetic Commission of Mexico.

The signal building was conducted by a subparty during the progress of the reconnoissance and afterwards by the full party. An observatory was built at Point Isabel longitude station.

TEXAS.

[WILLIAM BOWIE.]

In April the inspector of geodetic work proceeded to Texas for the purpose of inspecting the work of several triangulation parties operating in that State. Owing to unsettled conditions in Mexico the connection between the systems of triangulation by the Coast and Geodetic Survey in the United States and that executed by the Mexican Geodetic Commission was not completed, but such preliminary arrangements for that purpose as were possible were made. The several triangulation parties and the signal building parties were visited and their work found to be in satisfactory condition.

COLORADO, IOWA, KANSAS, MISSOURI, NEBRASKA, AND SOUTH DAKOTA.

[H. E. MCCOMB.]

STATIONS OCCUPIED.—*Colorado:* Central City, Golden, and Greeley. *Iowa:* Adel, Clarion, Des Moines, Estherville,* Forest City,* Humboldt (for Dakota City), Orange City, Rock Rapids, Sibley, and Toledo.* *Kansas:* Leavenworth. *Missouri:* Grant City, Independence, Liberty, Oregon, Platte City, Richmond, Rockport, Savannah,* and St. Joseph. *Nebraska:* Beaver City, Lincoln, Madison, Nebraska City, and Trenton. *South Dakota:* Elk Point, Fairfax,* and Yankton.

Magnetic observations were made at the stations named between July 1 and September 14 and between June 14 and June 30. Meridian lines were established at the stations indicated by asterisks. The stations were marked with stone posts marked with brass plates and sunk level with the ground.

Old magnetic stations were occupied at Nebraska City, Nebr., Des Moines and Sibley, Iowa, and Yankton, S. Dak.

Local surveyors displayed much interest in the work and requested copies of the observations.

NEVADA.

[JOHN H. PETERS.]

By July 1, 1912, the line of precise leveling eastward from San Francisco, Cal., had been extended to summit of the Sierra Nevada Mountains, a distance of 266 miles, leaving 323 miles to be completed in order to make the necessary connection at Beowawe, Nev. The work was continued eastward to Marmol, Washoe County, Nev., a station on the Southern Pacific Railway near the eastern point of the grade going into the mountains. This point was reached on July 13, 1912. The party then proceeded to the eastern end of the uncompleted portion of the line, and work was resumed at Beowawe, Nev.,

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working westward, along the Southern Pacific Railway to Marmol, which point was reached on October 25, 1912.

Connection was made during the progress of the work with such bench marks of other surveys as could be conveniently reached. The permanent bench marks used were of two types, viz, first a brass disk bench mark set in permanent existing structures of concrete or masonry, and second a stone post 6 feet long and 6 by 4 inches in its other dimensions, set in the ground and with 4 to 6 inches of its top projecting above ground. The usual brass disk was set with cement in the top of this stone with the top surface of the disk flush with the top of the stone.

Along the portion of the line between San Francisco and Sacramento the average distance between bench marks was 2.2 miles. Over the remainder of the line it was 3.6 miles.

A motor velocipede car and a hand car were used for the transportation of the party.

From experience gained in this work it is concluded that the larger percentage of nonchecks on steep grades is due to atmospheric refraction caused by inequalities in temperature and that a very small percentage is due to the inclined footing of the rods.

ARIZONA.

[A. F. BEAL, O. H. GAARDEN, and LLOYD W. WEED.]

Work at the magnetic observatory at Tucson, Ariz., was continued under the direction of Mr. L. W. Weed until September 18, when the charge of the observatory was transferred to Mr. A. F. Beal. Mr. A. H. Gaarden was attached to the observatory from August 12 to November 1, and aided in instructing the new observer.

The usual absolute determinations of declination and intensity were made, scale values determined, and meteorological observations recorded twice a day. The usual Weather Bureau reports were made daily. The magnetograph was kept in operation with but slight interruption, and a continuous record with the seismograph has been maintained.

Disturbances were recorded and special rapid-rate observations with the magnetograph were taken on certain term days.

Time observations were taken with the sextant and these were checked at various times by telephonic time signals and by observations of star transits. A meridian line 1,027.24 feet in length was established.

PACIFIC COAST.

WASHINGTON.

[R. B. DERICKSON, Commanding Steamer *Gedney*.]

In November a detailed topographic and hydrographic survey was made at Tacoma, Wash., of the Milwaukee railroad docks and ships, the mouth of the Puyallup River, and the St. Paul Lumber Co.'s dock. This survey extended out to about the 20-fathom curve in Commencement Bay. A new light and a fog signal were located. The tidal bench marks established in this work were connected by leveling with

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the city bench marks. At Olympia, Wash., a survey was made of the water front and of the shoal waters at the head of Budd Inlet. Tides were observed and the elevation of bench marks determined. Four old triangulation stations were recovered and marked. The positions of several new wharves between Olympia and Seattle were determined and soundings were made alongside the wharves.

[F. H. HARDY.]

In March the positions of the wireless telegraph station at Friday Harbor, San Juan Island, Wash., were determined.

[H. A. SERAN.]

Between May 27 and the close of June revision work for the correction of the existing surveys of Puget Sound, Wash., was in progress. This work includes determinations of the positions of wharves and prominent buildings in and around the principal ports.

A resurvey of Semiahmoo Peninsula was made and the new wharves and prominent buildings in Bellingham were determined. The water front of Anacortes and the shore line of the southern end of Guernes Island were rerun. The wharves at Coupeville were located and a resurvey was made of Neah Bay, the new wharves at Port Angeles and Ediz Hook were determined, a resurvey was made of Point Wilson and arrangements were made to obtain copies of surveys by the Corps of Engineers, United States Army, of Admiralty Head and Marrowstone Point.

All of the resurveys and determinations mentioned were made with the plane-table. Sufficient shore line was run to enable the features determined to be transferred to the original sheets.

[E. H. PAGENHART.]

SUMMARY OF RESULTS.—Reconnoissance: 300 square miles of area covered, 19 lines of intervisibility determined, 6 points selected for scheme, 1 signal pole erected, and 3 observing tripods and scaffolds built.

In the spring of 1913 instructions were issued for a triangulation connecting the survey of the Strait of Fuca with the triangulation in the vicinity of Grays Harbor, stations to be established along the coast at intervals of about 10 miles.

Reconnoissance was begun from stations Vancouver, Arched Rock, and Slip of the triangulation of Fuca Strait and by June 30 was extended south through six stations to the Quillayute River. Signal building was carried on by a separate construction party. Four stations were prepared. On heavily wooded peaks the stations were built above the trees instead of cutting lanes to clear the lines of sight. Pack animals were used to transport the party outfit, and a launch was used along the coast.

OREGON.

[EDGAR E. SMITH.]

In February the geographic positions of wireless telegraph stations at Portland and Astoria, Oreg., were determined by triangulation. At

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Portland two new triangulation stations were established and two old ones recovered. The towers of the Federal Wireless Telegraph Co. in Lents and those of the Young Men's Christian Association in Portland were determined.

In Astoria three triangulation stations were occupied. The positions of the towers of the Marconi Wireless Telegraph Co. at Astoria and of the Navy wireless station at North Head were determined.

[E. B. LATHAM.]

On April 28 work was begun on the determination of the geographic positions of aids to navigation and prominent objects along the Columbia River. In this work the triangulation stations established by the Corps of Engineers, United States Army, were utilized. Transportation for the party was furnished by the commanding officer at Fort Stevens. Similar facilities were offered by the lighthouse inspector of the district.

It was found impracticable to recover or use the triangulation stations previously determined by the Coast and Geodetic Survey.

Observations for determining the positions of all lights from the entrance of the river to stations Cathlamet and Bugby-Hole Light were made by the end of June.

CALIFORNIA.

[F. WESTDAHL.]

The work of the San Francisco suboffice includes correspondence relating to matters of interest to the survey on the Pacific coast, attending to the forwarding of instruments and supplies sent from the office at Washington, making arrangements for the transportation of officers traveling to or from Pacific coast points or the Philippine Islands, furnishing information concerning charts and publications, and other miscellaneous duties.

A resurvey of the immigration station on Angel Island, San Francisco Bay, was made by Mr. O. J. Bond, jr. The work done consisted in the mapping of improvements such as houses, roads, and wharves and releveling over the portions where grading had been done.

Mr. Bond also determined by triangulation the positions of two towers, suspending an electric power cable over the entrance to Oakland Harbor, and of a new wharf in Monterey Bay.

The position of the Marconi wireless tower at Marshfield, Oreg., was determined by the officer in charge of the suboffice.

Information relative to the coasts of California and Oregon for insertion in a new edition of the table of depths for channels and harbors was gathered.

The construction of a whaleboat for use by a survey party in the Hawaiian Islands was ordered and the boat when completed was inspected and forwarded.

Tidal observations with an automatic gauge at Sausalito were continued during the year.

[FREMONT MORSE.]

SUMMARY OF RESULTS.—Reconnoissance: 29.8 square miles of area covered, 61 lines of intervisibility determined, 17 points selected for scheme. Triangula-

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tion: 29.8 square miles of area covered, 10 signal poles erected, 33 stations occupied, for horizontal measures (16 topographically), 33 geographic positions determined (13 topographically).

In January and February determinations were made either trigonometrically or by topographic methods of the positions of wireless telegraph towers as follows: Eureka (two towers), Sacramento, San Francisco (two Marconi towers), San Francisco (two Federal towers), San Luis Obispo, East San Pedro, Avalon, Los Angeles (two towers), and San Diego.

The position of a new lighthouse established at the end of San Pedro Breakwater was determined by triangulation.

ALASKA.

[F. L. ADAMS.]

The magnetic observatory at Sitka, Alaska, continued in operation throughout the year.

The Eschenhagen magnetograph and the Bosch-Omari siesmographs made continuous records and the required absolute observations, scale-value determinations, and daily meteorological observations were made.

Special rapid-rate registration was carried out on specified term days in each month in accordance with requests for international cooperation.

The observatories and instruments are in good condition.

Fourteen earthquakes were recorded between July 1 and December 31 and 13 between January 1 and June 30. There were few magnetic disturbances in this period.

[R. M. PATTON, Commanding Steamer *Explorer*.]

SUMMARY OF RESULTS.—Topography: 87.7 miles of general coast line surveyed. Hydrography: 356¼ square miles of area covered, 1,444.7 miles run while sounding, 5,776 angles, 17,119 soundings, 4 tide stations established.

During the season of 1912 the steamer *Explorer* was employed on the survey of the approaches to the Kuskokwim River.

In accordance with instructions the hydrography was confined to the channels and the shoals within them, and soundings were carried toward the shore only to a depth of 10 or 12 feet. But four signals were erected for the hydrography, prominent natural objects being generally used for the purpose and these being afterwards determined in position by triangulation and traverse measurement. A series of north and south lines of soundings was run, spaced about half a mile apart.

The area covered by the soundings includes the approaches to the Kuskokwim from a north and south line approximately 5 miles west of Cape Newenham eastward to the entrance to Goodnews Bay.

In the limited season available for work, with unfavorable weather conditions, it was found impracticable to thoroughly develop all of the shoal areas discovered during the work. Within the limits of the region surveyed there is a dangerous shoal area, trending north-northeast (true) from a point three-fourths of a mile north of Cape Newenham for a distance of 9¼ miles. The least depth found on this

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shoal was 8 feet at mean lower low water, but it is probable that there is as little as 6 feet in places. The bottom in this vicinity is irregular.

A second shoal area with 6 fathoms of water or less was discovered, beginning at a point 13 miles north by west (true) from Cape Newenham and thence trending in a northerly direction for about 10 miles. This shoal, as defined by the 6-fathom curve is long and narrow, having a width of from 1 to 2 miles. The least water found on it was 22 feet.

In order to determine the position points for the hydrography an additional triangulation station was established near the southern limit of the work of the previous season, and from this a traverse line was carried ahead, first with the plane table and afterwards with the transit and stadia. This traverse line being found in error, an additional station was established at hydrographic signal "Back," about 5 miles south of Red Mountain. The position of this point was determined by measuring with the tape a traverse along the beach from triangulation station Loz to two points to the southward from which station Back could be determined. An azimuth was carried ahead independent of the traverse.

By this means six points were determined with an accuracy sufficient for the purposes of the hydrography. Five of these points have a direct check on the triangulation of the previous season.

Magnetic observations were made at Seattle, Wash., at the beginning and end of the season, at Unalaska and at a shore station on the working grounds.

The ship was swung for compass deviation at Union Bay, British Columbia.

Work was closed on September 18 and the vessel proceeded to Seattle.

The survey of the Kuskokwim was resumed early in June and was in progress at the close of the fiscal year.

[F. H. HARDY, Commanding Steamer *Yukon*.]

SUMMARY OF RESULTS.—Triangulation: 50 square miles of area covered, 30 signal poles erected, 27 stations occupied for horizontal measures, 30 signal poles erected, 26 geographic positions determined. Topography: 170.7 square miles of area surveyed, 92.9 miles of general coast line, 8.5 miles of roads, 2 topographic sheets finished. Hydrography: 190 square miles of area sounded, 444 miles run while sounding, 1,297 positions determined, 6,464 soundings, 1 tide station established, 2 hydrographic sheets finished.

The party on the steamer *Yukon* was engaged during the season of 1912 in the triangulation, topography and hydrography of Turnagain Arm, Cook Inlet, Alaska.

Work was retarded by unfavorable weather and by the violent winds and strong tidal currents in Turnagain Arm.

By the close of the season on September 22 the triangulation and topography of Turnagain Arm had been carried from a line 1 mile west of Chickaloon River to triangulation station Salt eastward to the head of the arm, and the hydrography of the adjacent area completed.

The party returned to Seldovia in April to put the steamer *Yukon* and launch *Alpha* in commission. In May a rock at the entrance to

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Coal Bay, Port Graham Harbor, was located. Field work of hydrography in Kuskokwim Bay was begun on June 10 and was in progress at the close of the fiscal year.

[C. G. QUILLIAN, Commanding Steamer *McArthur*.]

SUMMARY OF RESULTS.—Triangulation: 65 square miles of area covered, 26 signal poles erected, 14 stations occupied for horizontal measures, 10 geographic positions determined. Topography: 68 square miles of area surveyed, 159.5 miles of general coast line, 2 topographic sheets finished. Hydrography: 749 square miles of area covered, 905.2 miles run while sounding, 3,963 positions determined, 6,025 soundings, 3 tide stations established, 3 hydrographic sheets finished.

On July 1 the party on the steamer *McArthur* was engaged in surveys on the coast of southwestern Alaska.

The work done during the season included a complete topographic survey of Aialik Bay on a scale of 1/40,000, a hydrographic survey of the bay plotted on the same scale, also complete excepting a small area immediately outside of the Chiswell Islands, and soundings for about 15 miles off the entrances to Aialik Bay and Resurrection Bay. During the course of this work two automatic tide gauges were kept in operation for three months, observations for magnetic declination were made on Aialik Bay at Seward, and the contours were sketched in on the western side of the peninsula which terminates in Cape Resurrection.

Only sufficient triangulation was executed to control the topographic work and the majority of the signals were located with the plane table.

The weather during the season was unfavorable for rapid progress and owing to the exposed situation of this portion of the coast the time available for surveying operations was limited.

Between October 6 and 14 a hydrographic examination was made of Nakat Harbor.

Work was closed for the season on October 14 and the vessel sailed for Seattle, arriving October 18.

On her way to the working ground in Cook Inlet the steamer *McArthur* stopped to make a reconnoissance survey of Burnett Inlet, extending from a small island on the eastern side to the upper end of the islands just above the cannery.

The shore line was run in on a scale of 1/10,000 on a plane-table traverse. Sounding lines were spaced 200 meters apart in the area immediately off the cannery and slightly wider apart, further out. A shoal previously reported was located and another shoal with 15 feet of water on it was discovered. Points for the survey were located by a plane-table triangulation. A number of points were marked for future reference. Azimuth observations were made from a station on the cannery wharf. Magnetic observations were made with compass declinometer and the ship was swung to give the magnetic declination.

Upon the completion of this work the *McArthur* proceeded to Seward, Alaska, touching at Juneau to inspect the tide gauge there.

The position of the city dock at Petersburg was determined and located on the chart. The tide gauge at Juneau was inspected and put in order and the gauge was connected by leveling with the tidal bench marks.

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A party was established in camp for the survey of Iniskin Bay. The main party then proceeded with signal building and reconnoissance with the object of extending the triangulation into Kamishak Bay. A base line 1,000 meters in length was measured at Iniskin Bay and the local triangulation was taken up by the camping party. Topography was begun as soon as sufficient stations were determined. By June 30, 16 stations had been built in Kamishak Bay and 7 of them had been occupied, 2 tide gauges had been established, and about 16½ miles of topography had been completed.

[R. B. DERICKSON, Commanding Steamer *Gedney*.]

SUMMARY OF RESULTS.—Triangulation: 392 square miles of area covered, 38 signal poles erected, 32 geographic positions determined, 22 stations occupied for horizontal measures. Magnetic work: 8 stations occupied for magnetic observations, 2 complete swings of ship for magnetic deviation. Topography: 117.3 miles of general coast line, 5 topographic sheets finished. Hydrography: 274.5 square miles of area sounded, 945.1 miles run while sounding, 3,666 positions determined, 4,778 soundings, 3 tide stations established, 5 hydrographic sheets finished.

During the period from July 1 to October 3, when work was closed for the season, the party on the steamer *Taku* was engaged in general surveys in Prince William Sound, Alaska.

The triangulation, topography, and hydrography of Port Wells which had been begun on June 19 were completed on August 26. Between August 30 and October 3 the party was engaged in the survey of Simpson Bay.

At Port Wells heavy rains were experienced and the weather conditions during the season were generally very unfavorable to work.

By July 5 the erection of signals for the triangulation was completed. The occupation of stations was then begun and by July 23 the triangulation was completed. All triangulation stations, both those in the main scheme and the intersection stations, were marked with C. & G. Survey disk marks cemented into drill holes in the rock, and descriptions of the stations were made to accompany the records.

The topography of Port Wells is included on two sheets, one on a scale of 1/20,000 and the other on 1/40,000 scale. This work was completed on August 26.

The hydrography was begun on July 27 and completed August 24. It includes Culross Island; east and west Twin Bays on the north side of Perry Island; the entrance to Perry Island Passage from Axil Lind Island on the north to Upper Passage on the south, and as far east as the surveyed area west of Naked, Storey, and Knight Islands, and through Perry Island Passage from Lone Island and the Dutch group of islands to the entrance to Port Wells. The only shoal of any size or importance extends for about three-fourths mile to the northward from the north end of Lone Island. Deep water, from 200 to 300 fathoms, lies north of this and between Lone Island and the Dutch group, affording a broad, deep entrance to Perry Island Passage. A rock, bare at low water, was located about one-fourth mile south of Fool Island. Deep water lies between this rock and Perry Island. Perry Island Passage is clear with depths of 100 to 300 fathoms.

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Tide observations with automatic gauge and staff were made at a station in Culross Bay from July 19 to August 25, and three tidal bench marks were established. Observations for magnetic declination were made at station Tree on August 23. On August 29 magnetic observations were made at station Nibsy on Observation Island. On the way to Simpson Bay the ship was swung for compass deviation on August 30.

On August 31 work was begun on the survey of Simpson Bay. Signals were erected for the triangulation and a plane-table triangulation was carried to the head of the bay. A tide staff was erected in Simpson Bay and three tidal bench marks established. The survey of the north area of the bay was completed on October 3, when work was closed for the season.

Work was begun on Eshamy Bay in May, 1913. The signal building and observation of angles were completed on May 26 and the sounding was then begun. The weather was favorable and with two topographic and one hydrographic parties at work the survey from the entrance of Port Wells to Port Nowell was completed by June 27.

[R. B. DERICKSON, Commanding Steamer *Gedney*.]

SUMMARY OF RESULTS.—Triangulation: 85 signal poles erected. Topography: 166.5 square miles of area surveyed, 301.8, 3 miles of shore line of creeks, 4 miles of roads and railroads, 7 topographic sheets finished. Hydrography: 144.2 square miles of area sounded, 1,606.2 positions determined, 21,183 soundings, 10 tide stations established, 1 current station occupied, 8 hydrographic sheets finished.

At the beginning of the fiscal year the party on the steamer *Gedney* was engaged in the survey of Tlevak Strait in southeastern Alaska.

During the latter part of June the necessary triangulation points had been recovered, signals erected, and other preliminary operations completed. Supplemental points were determined where necessary with the plane table.

The topography was practically confined to the shore line and adjacent mountain peaks. The topographic survey extends from Mellen Rock on the north and Shoe Rock on the south entrance of Tlevak Strait and was carried along the north end of Long Island from near Shoe Rock to Howkan village, thence along the east coast of Dall Island from opposite Howkan village to the south end of Suemez Island. This embraces the entire west shore of Tlevak Strait with the exception of Buldy Bay (View Cove). On the north and east side of the strait the shore line was surveyed from near Mellen Rock and Jackson Island along the south end of Sukkwan Island to the McFarland Islands, including the largest of the McFarland Islands.

From the west entrance of Sukkwan Pass the topography was carried along the coast to the North Pass and thence along the shore line of Halibut Nose including the northernmost of the Corlies Islands and the group called Nichols Islands. The topography is included on two sheets on a scale of 1/20,000. An additional projection on a scale of 1/10,000 was completed, extending from Halibut Nose and North Bay on the south to the south end of Suemez Island in the north. The shore line from the south end of Suemez Island to Cape Flores was sketched in by the hydrographic party.

The only part of the season's work not completely controlled by triangulation is the channel of Sukkwan Straits, extending from its

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west entrance to Tlevak Strait to the new town of Hydaburg, opposite Sukkwan Narrows. This work was taken up at the close of the season after Tlevak Strait had been completed from Cordova Bay to Bucareli Bay.

A topographic sheet on scale of 1/5,000 was constructed, three triangulation stations at the south end of the sheet were plotted, and from these a plane table and sextant triangulation was carried to the town of Hydaburg, a distance of 3 miles. Flags were placed along the shore line, which were used as signals by the hydrographic party. A reconnoissance and sketch of the North Pass of Sukkwan Straits from Tlevak Strait to the completed work at Hydaburg was plotted on a separate sheet which joins the work on both the 1/20,000 and 1/5,000 sheets.

The hydrographic work done during the season extends from Lacey Island and Shoe Rock at the southeast end of Tlevak Strait along the shores and in the bays at the north end of Long Island and the south end of Sukkwan Island, also the bays along the northeast coast of Dall Island with the exception of Buldy Bay (View Cove). The entire area between Sukkwan and Long Island was covered and that portion of the Strait along the east coast of Dall Island west of a line joining the McFarland and Nichols Islands, and from Nichols Islands to Halibut Nose, the entrance to Soda Bay and Channel extending from the Lively Islands, through Ulloa Channel to Bucareli Bay, giving a complete hydrographic survey of Tlevak Strait Channel from Cordova Bay to Bucareli Bay, a distance of 34 nautical miles and covering 4 hydrographic sheets. The soundings previously taken in Tlevak Strait were supplemented and the survey in that vicinity extended to the bays and channels northeast of the Narrows.

After completing the work in Tlevak Strait a hydrographic survey of Sukkwan Strait from its entrance to Tlevak Strait along the main ship channel to the anchorage off the town of Hydaburg was completed. This covers the most intricate portion of Sukkwan Strait.

Tides were observed during the season with staff gauges and with an automatic gauge.

Observations of currents were made during the progress of the hydrography and sufficient data gathered to determine the relation of slack waters in Sukkwan Narrows to the predicted high and low waters at Sitka.

Magnetic observations for declination were made at Turn Point and at the south end of Tlevak Strait.

As the result of information gained during this survey southbound vessels desiring a shorter inside route from Christian Sound can now make a saving of 25 to 30 miles by the Tlevak Strait route.

Vessels calling at the Klawak cannery, one of the largest canneries in southeastern Alaska, when bound for other ports on the west coast of Prince of Wales Island, have heretofore rounded the north and south ends of Prince of Wales Island, making an unnecessary detour of 170 miles between the ports of Sulzer and Klawak.

Work for the season was closed on October 12 and the vessel proceeded via Metlakatla and Ketchikan to Seattle arriving October 30.

In the spring of 1913 the survey of Kasook Inlet was completed. The position of a submerged rock at the north end of Grand Islands in Tlevak Strait was determined, and work was begun in Bucareli

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Bay. Assistance was rendered the Pacific Coast Co.'s steamer *Curacao* in getting off a reef at the south end of Fish Egg Island, and when that vessel was afterwards wrecked on a submerged rock and beached in Tonawek Bay, the passengers and crew with express and mail matter were taken off and conveyed to Ketchikan by the *Gedney*. The rock on which the *Curacao* struck was afterwards located and determined in position.

Triangulation stations established in 1906 were recovered and signals erected through San Christoval Channel. Tidal observations were made in the progress of the work. The area from Catalina Island to northwest of Lazaratita Island was thoroughly surveyed and temporary ranges showing the axis of the main ship channel were erected. Old triangulation stations were then recovered, signals were built and the hydrography and topography were continued to the southward of Cape Lynch. This work was in progress at the close of the fiscal year.

[F. WESTDAHL, Commanding Steamer *Patterson*.]

SUMMARY OF RESULTS.—Triangulation: 1,100 square miles of area covered, 24 signal poles erected, 5 observing signals built, 28 stations occupied for horizontal measures, 9 stations occupied for vertical measures, 30 geographic positions determined. Magnetic work: 3 stations occupied for magnetic observations. Topography: 58 square miles of area covered. 135 miles of general coast line surveyed, 1 topographic sheet finished. Hydrography: 15 square miles of area sounded. 134 miles run while sounding, 1,093 angles measured, 1,773 soundings made, 3 tide stations established, 1 hydrographic sheet finished.

During the period from August 17 to October 23 the party on the steamer *Patterson* was engaged in general surveys in Clarence Strait, southeastern Alaska. The work done included triangulation, topography, and hydrography, but in accordance with instructions especial attention was paid to the advancement of the triangulation.

The triangulation was extended in a general northerly direction from the base Lazaro-Ken to a junction with previously established stations on Caamano Head, Grinall Island, and Island Point.

The topography was begun near Cape Chacon. A projection was prepared on a scale of 1/20,000 to reach from that point northward to Scott Point, including McLean Arm, Gardner Bay, and Kendrick Bay. Two more projections were prepared on the same scale, the first to cover Ingraham Bay and the southern part of Moira Sound, and the other the northern part of Moira Sound, but owing to unfavorable weather work was not completed on either of these sheets. The existing chart of Niblack Anchorage and the sailing directions for that harbor were found to require considerable correction.

A limited hydrographic development was made of the inlets surveyed. They are all so deep that no more is needed. The shores are steep to, except at the head of the inlets, and there are few hidden dangers. The rocks exposed at low tide are, as a rule, flat-topped and smooth as if ice worn. Hydrographic work was done in McLean Arm, Gardner Bay, Kendrick Bay, in the bay north of Kendrick Bay, and Niblack Bay.

The rock shown on chart 8100, 1¼ miles southeastward from Wedge Island, marked as exposed at low tide, was carefully searched for but not found. Its removal from the chart is recommended. The reef southwest of Dall Head, marked "position doubtful" on the same chart, was found and its position determined.

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At Port Chester the depths at the anchorage shown on chart 8074 were found to be greater than the soundings on the chart would indicate.

Tides were observed at McLean Arm, Kendrick Bay, and Niblack Bay, but not for a sufficiently long period for the computation of a plane of reference.

Magnetic observations were made at Union Bay, British Columbia, and the ship was swung to determine the deviation of the compass.

Field work was closed on October 24 and the vessel sailed for Seattle, arriving October 31.

[J. B. MILLER, Commanding Steamer *Patterson*.]

SUMMARY OF RESULTS.—Physical hydrography: 102 surface temperatures taken at sea, three current stations occupied. Longitude: One longitude station occupied. Base measure: One secondary base line 0.8 kilometer in length. Magnetic work: Two ship stations occupied for magnetic observations and two shore stations occupied for magnetic observations.

The steamer *Patterson* began work in southeast Alaska in the early part of June and surveys were begun in two localities. For this purpose a party of 4 officers and 14 men with 3 power boats was put to work on a survey of the Shumagins while the steamer was engaged upon hydrography on Davidsons Bank, 60 miles southeastward and seaward from Unimak Pass, and 125 miles distant from the work of the detached party. The work in the Shumagins was begun in Zachary Bay on Unga Island, Humboldt Harbor on Popof Island, and the northern approach of both, and was extended eastward and southeastward through Popof Strait toward Nagai Island. The hydrography upon which the ship began work lies at a distance of about 40 miles offshore, southeast of Unimak Pass and southward and southwestward of Sannak Islands, and consisted of a search for two rocks which are indicated on the charts in the track of vessels approaching Unimak Pass from the southeast, but the existence of which is considered doubtful. This work was in progress at the close of the year. Tidal observations were begun at Sand Point in the Shumagin Islands with an automatic gauge to serve as a base station and subsidiary stations were occupied on the neighboring islands. Current observations were made at all open anchorages. No unusual or striking features of either tides or current were developed, the currents observed being moderate in strength, ranging from one-half to 2 knots. Magnetic observations were made at the base station at Seattle and at a new station at Sand Point in the Shumagin Islands. Observations were also made in Shelikof Strait between Semidi Islands and the mainland. The usual compass declimometer observations were carried through the Shumagin Islands.

OUTLYING TERRITORY.

PHILIPPINE ISLANDS.

[P. A. WELKER, Director of Coast Surveys.]

The Director of Surveys in the Philippine Islands, whose office is at Manila, has immediate direction of the details of the field and office work in these islands under general instructions from the Superintendent of the Coast and Geodetic Survey, makes plans for field

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work, and issued instructions to field parties. The results of magnetic observations made in the field are reported and discussed in the office at Manila, and drawings for new charts are there prepared and transmitted to the office at Washington for publication. The general plan of the division of the expenses between the Government of the United States and the Philippine government, which has applied since January 1, 1902, was observed during the year.

The first half of the fiscal year was notable as being one of the most stormy and disastrous seasons that have been known in the Philippine Islands. Stormy weather prevailed during much of the time and the regions of the field surveying operations were visited by most severe typhoons on November 6, 25, and 26, and on December 15 to 16. The destruction caused in the paths of these typhoons has been made the subject of individual and press reports and no detail repetition is considered necessary. The many lives that were lost, vessels that were beached and foundered, and the great destruction to property on shore are all matters of record. The most serious loss to the Coast and Geodetic Survey was the foundering of one of the launches of the steamer *Pathfinder* in Cebu Harbor October 15; the stranding of the steamer *Marinduque* on the coast of Palawan November 6, necessitating the loss of the services of the vessel for two and one-half months; the destruction of the surveying signals in the localities of the work; and the great amount of time lost by the various vessels on account of the weather conditions being too stormy for field operations. In addition to the time lost at work may be mentioned the extraordinary repairs required to the steamers *Pathfinder* and *Marinduque*, which kept the former out of the field for five months and the latter four and one-half months, resulting in a considerable reduction in the output of work. Except during intervals when repairs were necessary to the vessels, the parties attached to the five steamers available for duty were continuously engaged in the field. There was also one shore party engaged for seven and one-half months during the year in making observations for the determination of the magnetic elements in the various parts of the islands.

A reference to progress sketch No. 15 will show that the surveys of the coast of the Philippine Islands have covered all of the localities which are at present of any considerable commercial importance, the remainder of the work being in localities many of which are dangerous for navigation but which at the present date are seldom visited by vessels engaged in trade. The unsurveyed regions are at such great distances from the base of supply and so far from the general lines of travel for merchant vessels that the matter of arranging for furnishing the various vessels of the Survey with coal, oil for motor launches, and general supplies has become a serious problem. The nearest base of supply for the *Pathfinder* is 260 miles, the *Romblon* 250 miles, the *Fathomer* 135 miles, the *Research* 130 miles, the *Marinduque* 90 miles. Some of these distances will greatly increase as the work progresses. The necessity for establishing coaling stations nearer the localities of work will therefore be recognized.

During the fiscal year 1913 there was completed the most extensive and probably the most important trigonometrical survey that has been executed in the Philippine Islands. The triangulation over the large water area bounded by Luzon, Burias, Mastate, Panay, and

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Tablas Islands, thence extending via Mindoro and Panay across the Cuyos to the Calamianes and Palawan, thence northward over Apo Reef and Verde Island Passage to a connection with the former work in the Lubang Islands, was all completed during the fiscal year. This work involved lines as much as 91 statute miles in length, the longest that will be required for any survey in the Philippine Islands. It is gratifying to note that there is now a connected system of triangulation over the greater part of the coast of the Philippine Islands, which will permit the adjustment upon a uniform datum to proceed without any interruption. By reference to the progress sketch, it will be seen that little triangulation of a secondary class will be required in the future, the trigonometric work remaining for execution being almost entirely of a tertiary class.

During the fiscal year there has been the usual exchange of results and harmonious cooperation with the naval and military authorities, and the various bureaus under the government of the Philippine Islands.

During the year 1,018 square miles have been covered by reconnoissance, 12,916 miles of triangulation have been completed, and 945 miles of coast line surveyed, 923 square miles of topography have been surveyed, and 32¼ topographic sheets completed. The hydrographic work has covered 10,604 square miles, 22 tide stations have been occupied, and 47¾ hydrographic sheets have been completed. The general coast line surveyed during the year is about 5.2 of the total length. Since the beginning of the work about 63 per cent of the general shore line has been surveyed.

Among other matters that received the attention of the Director of Coast Surveys were the series of tide observations at the automatic tide-gauge stations at Manila, the compilation of a revised table of distances between ports in the Philippine Islands, the compilation of a list of Philippine geographic names, and the work of the Harbor Lines Commission, of which the Director is a member.

During the fiscal year sections 1 and 5 of the Philippine Islands Sailing Directions were revised and republished, five Notices to Mariners were prepared and published, and much original hydrographic information was obtained. The chief of the nautical division served as a member of the Lighthouse Board of the Philippine Islands.

The sale and distribution of the charts and other publications of the survey was attended to by the suboffice at Manila.

Five new maps of the Philippine Islands were compiled in the geographic division, and progress was made in the compilation of a number of other maps. Among these is a map of the entire Philippine Archipelago on a scale of 1/1,000,000 which will conform to the scale adopted by the International Geographic Congress for an atlas of the world.

[F. G. ENGLE, Commanding Steamer *Research;* WM. M. STEIRNAGLE, Commanding Steamer *Research.*]

SUMMARY OF RESULTS.—590 square miles of area covered, 9 stations selected for secondary scheme, 13 lines of intervisibility determined. Triangulation: 1,540 square miles of area covered, 24 signals and scaffolds erected, 16 stations occupied for horizontal measures, 47 geographic positions determined. Topography: 58 square miles of area surveyed, 155 miles of general coast line surveyed, 13 miles of rivers and creeks, 18 miles of roads, 4½ topographic sheets

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finished. Hydrography: 1,308 square miles of area sounded, 5,086 miles run while sounding, 61,225 soundings, 7 tide stations established, 9¼ hydrographic sheets finished.

At the beginning of the fiscal year the party attached to this steamer was engaged in general surveys in the region about Masbate, Biliran, Maripipi, and Talajit Islands. The triangulation covering this area was completed before the beginning of the year.

Topographic work was executed on the north coast of Biliran Island; over the entire areas of Generuan, Tagampul, Tomasa, Sambauan, Maripipi, Balanguingue, Bugton, and Basley Islands; and on the east coast of Masbate Island from Caduruan Point to Cataingan Bay.

Complete hydrographic surveys were made over practically the entire area, extending from a point about 2 miles east of Maria Island to Caduruan Point on Masbate Island, thence along the east coast of Masbate to the head of Cataingan Bay, thence southeasterly to Bugton Island, thence to a point about 1 mile northwest of Talajit Island, around this island at a distance of about 1 mile, and thence to Tomasa Island, thence due south to the north shore of Biliran Island, westerly along this shore to Tincansan Island, thence west for a distance of 6 miles south for 11 miles, and thence to the point of beginning.

An automatic tide gauge was kept in operation in Santo Nino Harbor, Santo Nino Island, until July 15, when it was moved to Cataingan Bay. Staff gauges were erected and read when required for the purpose of reducing soundings.

In December work was begun on the south coast of Masbate Island. An automatic gauge was established at Guion, and a traverse for locating hydrographic signals was run from Caduruan Point to Nanco Point on Masbate Island, a distance of about 16 miles.

In January the work of triangulation and hydrography was in progress on the south coast of Masbate. The hydrography was finished by March 6 and the triangulation by March 22, thus completing all necessary surveys in that region.

The triangulation consisted of one large quadrilateral and one small triangle, the longest line being about 42 miles. It furnishes a connection with previous surveys in that locality. The topography which covered one-half a sheet was for purposes of verification only.

The hydrography was carried over the region approximately from Caduruan Point to Buri Point on the south coast of Masbate and extending offshore to Tanguingui Island Lighthouse and connecting with previous surveys.

An automatic tide gauge was established at Guion and was kept in operation from December 21 to March 12.

One sea station for magnetic declination was occupied northwest of Guinauayan Island.

On March 24 work was begun in the area between Masbate and Samar, beginning on the coast of Samar. Triangulation was extended from Tagapula Island northward to southern Luzon and through San Bernardino Strait to San Bernardino Lighthouse. On May 14 final connection was made with the work of 1902 in San Bernardino Strait. Topography on the west coast of Samar was

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completed from Malayoc Point to Balicuatro Point, connecting with previous surveys. The topographic work also included the entire areas of Dalupiri and Capul Islands.

The hydrography inshore was extended over the limits of the topography on the west coast of Samar and also around Dalupiri Island and along the east side of Capul Island. The offshore hydrography was extended to the limits of the topography on the Samar coast and for about 12 miles from the shore. Tide observations with an automatic gauge were made at Mano River, Samar, and staff readings were made at other points in the progress of the work.

[L. O. COLBERT, Commanding Steamer *Marinduque*.]

SUMMARY OF RESULTS.—Triangulation: 2,252 square miles of area covered, 40 signals and scaffolds erected, 28 stations occupied for horizontal measures, 83 geographic positions determined. Topography: 298 square miles of area surveyed, 162 miles of general coast line surveyed, 72 miles of rivers and creeks, 2 miles of roads, 10 topographic sheets finished. Hydrography: 1,857 square miles of area sounded, 2,631 miles run while sounding, 35,662 soundings, 1 tide station established, 15 hydrographic sheets finished.

The survey of Ragay Gulf, Luzon Island, by the party on the steamer *Marinduque* was continued from July 1 until July 30, when work for the season was temporarily suspended. During this time the hydrography of the area remaining unfinished in Ragay Gulf was completed. The topographic survey of the shore line of the Gulf was closed by an 18-mile traverse over the section between Pusgo and Lian Points. An automatic tide gauge was continued in operation until the close of the work.

In October work was begun on the east coast of Palawan and continued until November 6, when the steamer was stranded on a reef during a typhoon and was taken to Manila for repairs. In this region the triangulation was advanced in cooperation with the party on the steamer *Fathomer* from the line Cabulauan to Dalan on the islands of Cabulauan and Dalanganen. This line had previously been established by the party on the *Fathomer*. The resulting figure connected the points Cabulauan, Dalen, Pina, and Norte. From the line connecting the last two points the work was carried to the north, south, and west, connecting the island of Palawan with the general scheme of the triangulation of the Philippine Islands. Signals were erected to the southward as far as the line Pagdanan to Green. Five intersection stations were established and observations for the location of many prominent mountain peaks were obtained.

In January the *Marinduque* began work on the west coast of Mindoro. A main scheme of triangulation was carried up the coast from Apo Reef to Verde Island Passage, and subsidiary points were located for the control of the topography and hydrography. The topography was carried from the mouth of the Luminato River to Balto Point on the north coast of the island, joining with the work of 1906. The inshore hydrography was completed within the same limits as the topography. The offshore soundings were carried to the 1,000-fathom curve, a distance of about 15 miles from the west coast and 5 miles from the north coast. The hydrography included the development of Discovery Bank and Mamburao Reef. Tide staff readings were made in the progress of the work.

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[R. F. Luce, Commanding Steamer *Romblon*.]

Summary of results.—Triangulation: 1,433 square miles of area covered, 44 signals and scaffolds erected, 16 stations occupied for horizontal measures, 47 geographic positions determined. Topography: 171 square miles of area surveyed, 210 miles of general coast line surveyed, 6 topographic sheets finished. Hydrography: 1,335 square miles of area sounded, 4,114 miles run while sounding, 59,875 soundings, 6 tide stations established, 10 hydrographic sheets finished.

During the season from July 1 to September 19 the steamer *Romblon* was engaged in general surveys in the vicinity of Burias, Masbate, Sibuyan, and Romblon Islands.

All of the triangulation in the area covered by the instructions for this work had been completed prior to July 1 and the work after that date consisted entirely of topography and hydrography.

The topography done during the period mentioned was the mapping of the shore line of the following localities: North coast of Masbate Island, between Bugui and Colorada Point Lighthouses; Romblon Island, between Tongo and Apunan Points; and Alad and Cobrador Islands.

The hydrographic work done covers the following areas: North coast of Sibuyan Island, near the town of Magallanes; between Bugui and Colorada Point Lighthouses; northeast coast of Romblon Island and shores of Alad and Cobrador Islands; reefs near Cresta de Gallo Island; offshore work east of Sibuyan Island; northeast coast of Romblon Island and north coast of Romblon Island.

In general, in the entire work, lines were run radially to the coast to at least 1 mile from the shore, and beyond that usually parallel to the shore.

Inside the 25-fathom curve the lines were spaced about 100 meters apart and outside the 25-fathom curve from 250 to 275 meters apart except where the bottom was extremely irregular, when a smaller interval was used. Between the 65 and the 110 fathom curves the lines were spaced about two and one-half to the mile. Outside the 110-fathom curve soundings were taken about 3 miles apart.

Tidal observations with an automatic gauge and tide staff were made at Romblon, and a tide staff was also established at Magallanes on the north coast of Sibuyan Island, and continuous readings were taken there, day and night, for five days for the purpose of establishing a plane of reference.

In October, after completing a small piece of work on the northwest coast of Masbate Island, combined field operations were begun in the vicinity of the Lubang Islands.

A tertiary triangulation based upon points previously determined on the east coast of Ambil Island and west coast of Golo Island was carried to a point west of the town of Looc and another on Manog Point, Lubang Island. From the stations determined sufficient points were located to control the eastern section of the Lubang Islands.

Topographic work was done on the north, east, and south coasts of Lubang Island; on the east, south, and west coasts of Ambil Island; and the western half of the south coast of Golo Island. Small detached pieces of topography were also executed on the north and west coasts of Masbate Island.

For the completion of the survey of the Sibuyan Sea small detached pieces of hydrography were executed off the northwest coast of Masbate Island.

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In the region about the Lubang Islands hydrographic work was done as follows: On the south coast of Lubang Island from Tapusan to Manog Point; southern part of Golo Passage from Manog Point on Lubang Island to a point on the south coast of Golo Island, about 2 miles east of Golo Passage; off the east coast of Lubang Island, from and including Golo Passage to the town of Looc in Looc Bay; on south and west coast of Ambil Island, extending about 1 mile offshore; Port Tilig; off northeast coast of Lubang Island from Balikias Bay nearly to Antipolo Point; along center of passage Ambil and Lubang Islands; over a strip 1 mile wide on the north coast of Lubang from Port Tilig to connect with work on the west coast of Ambil Island; south coasts of Lubang and Golo Islands from Tapusan Point on Lubang to a point south of the center of Golo Island; and over the area north of Golo Island and east of Lubang and Ambil Islands, extending nearly to the Luzon coast to a connection with the hydrography previously executed.

An automatic gauge was maintained at Port Tilig throughout the season and the staff readings were made at various places.

At the beginning of the calendar year the party attached to the steamer *Romblon* was engaged in combined field operations in the region about the Lubang Islands. That work was commenced on October 31 and completed on February 7, when hydrography was interrupted by the strength of the northward monsoon. The vessel next took up surveys in the vicinity of the Calamianes Islands, which were continued until May 14. Work was then resumed in the vicinity of the Lubang Islands, the weather conditions being again favorable. The survey of the Lubang Islands was completed on June 17 and the vessel was again transferred to the survey of the Calamianes Islands on June 23. The secondary triangulation in the Lubang Islands having been completed in the year 1906, only such additional triangulation was executed as was necessary for the location of points for carrying on the topography and hydrography. For work in the Calamianes the secondary scheme of triangulation was carried northward from points on Cabulauan Islands and Pinachiuyan Islands, Linapacan, Culion, and Galloc Islands to Basuanga Islands. From the points thus established and from those previously established on Culion and Calambagan Islands, a tertiary scheme of triangulation for the location of points for topographic and hydrographic surveys was carried over the region. The topographic work executed during the second half of the fiscal year consisted of the mapping of all those parts of the Lubang group that had not been completed previous to the last report, thus resulting in a complete topographic survey of those islands. The topographic work in the Calamianes included the shore line of the west coast of Culion Islands from Dicabaito to Galloc Islands and the shores of the eastern bay on the north coast of Linapacan. In the Lubang Islands the topography was carried over the entire surface of the islands, in the Calamianes it was carried a few miles inward. The hydrographic work in the Lubang Islands included the inshore and offshore work necessary to complete the survey of that region, extending to the westward to include the 100-fathom curve, to the northward and eastward junction of previous work, and to the southward to a junction of the work executed off the north coast of Mindoro. In the Calamianes, inshore

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and offshore hydrographic work was executed within the limits of the topographic work extending from Dicabaito to Galloc Islands off the west coast of Culion and also the eastern bay on the north coast of Linapacan Islands. In connection with the work in the Lubang Islands an automatic tide gauge at Port Tilig was maintained in operation until February 13. Staff readings were taken at various stations throughout the locality of the work. All the staffs in the Lubang Islands were referred to the datum plane established at Port Tilig and those in the Calamianes were referred to the automatic gauge established at Port Uson by the party on the steamer *Fathomer*.

[EBERHARDT MUELLER, Commanding Steamer *Fathomer;* T. J. MAHER, Commanding Steamer *Fathomer.*]

SUMMARY OF RESULTS.—Triangulation: 5,378 square miles of area covered, 20 signals and scaffolds erected, 22 stations occupied for horizontal measures, 102 geographic positions determined. Magnetic work: 6 magnetic stations occupied. Topography: 76 square miles of area covered, 233 miles of general coast line surveyed, 10 miles of rivers and creeks, 15 miles of roads surveyed, 2¾ topographic sheets finished. Hydrography: 4,088 square miles of area sounded, 8,080 miles run while sounding, 56,592 soundings, 5 tide stations established, 2¾ hydrographic sheets finished.

During the period from July 1 to December 31 this party completed the secondary triangulation extending from the Island of Panay, across the northern part of the Sulu Sea over the Cuyo Islands to the island of Palawan, which had been begun in March of the previous year, and extended the survey along the west coast of Mindoro westward to Apo Reef. The topography and hydrography of Apo Reef was completed. Tertiary triangulation was executed in Coron Bay, through Coron Passage and along the east coast of Busuanga Island; the topography of part of the east coast of Culion Island and all of the smaller offlying islands was completed and the inshore hydrography in the same region was almost finished. The offshore hydrography included such soundings as it was possible to make while the triangulation was in progress and about 500 square miles of the comparatively shoal area lying east of Culion Island.

In the survey of Apo Reef the soundings were carried out to depths of 250 to 500 fathoms, with detailed work around the edge and over the reef. A channel running east and west through the middle of the reef was developed, and in this an anchorage affording good protection from the sea was found. The eastern edge of this channel contains many rocks with little depth of water over them, and although passage through is possible it is very dangerous except for small boats.

Numerous uncharted shoals were found and located throughout the region surveyed, many of which are dangerous to navigation.

Tidal observations were made with an automatic gauge on Bisucay Island and at Port Uson on Busuanga Island, and staff readings were taken on Apo Island.

Currents were observed at two stations, one on a shoal 15 miles east-northeast of Nangaloo Island, the other at the southern extremity of Apo Reef.

Magnetic declination was observed at six stations, four in the Calimianes, one on Apo Reef, and one on Dalanganem Island.

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The *Fathomer* remained at Manila making repairs and obtaining supplies until March 8, when she returned to the working ground and resumed work on the surveys in the extensive region having the Quinilugan Islands as a central point and extending over the area bounded by Panay, Mindoro, Northern Palawan, the Calamianes, and Apo Reef. This work was continued without interruption until April 26, when the steamer returned to Manila for the purpose of making repairs and transfer of command. The command was transferred from Mr. Eberhardt Mueller to Mr. T. J. Maher on May 2. The field work was resumed on May 8. During the remainder of the fiscal year only a small amount of tertiary triangulation was done for the control of topography and inshore hydrography. The region of triangulation being sufficiently large to engage the hydrographic party for a considerable period. The topographic work was executed on the south shore of Busuanga Island and the north shore of Coron Island. Attention was chiefly confined to hydrography, on account of the vast unsurveyed water area assigned to the steamer. Ship hydrography was carried on in the waters of Cuyos, Cabulauan, and Calamianes Islands and the Apo Reef. This work was offshore from 15 to 40 miles, necessitating observations distant from 15 to 55 miles. Favorable weather conditions permitted the development of numerous offshore shoals. Depths varying from 200 to 1,500 fathoms made up and down casts necessary, and the very regular bottom required a closer development than is usual in such depths. The submarine sentry was used in localities where irregular bottom was found with excellent results in locating shoals. By this means shoal areas missed by the lead were found. Inshore hydrography was executed in Coron Passage and off the east coast of Culion Island. Observations of currents were made at 16 stations. A northwestward current varying from 1½ to 5 knots was found to set from the Sulu Sea to Mindoro Strait. The automatic tide gauge established in Port Uson on November 12, 1912, was still in operation at the close of the fiscal year. Readings for the reductions of soundings were taken from subsidiary staffs at various points. The vessel was in the field at the close of the year.

[H. C. DENSON, Commanding Steamer *Pathfinder*.]

SUMMARY OF RESULTS.—Base lines: 1 base line measured. Reconnoissance: 428 square miles of area covered, 5 stations selected for secondary scheme, 20 lines of intervisibility determined. Triangulation: 2,311 square miles of area covered, 56 signals and scaffolds erected, 43 stations occupied for horizontal measures, 45 geographic positions determined. Azimuth: 1 station occupied for observations of azimuth. Topography: 320 square miles of area covered, 185 miles of general coast line surveyed, 52 miles of rivers and creeks surveyed, 96 miles of roads surveyed, 9 topographic sheets finished. Hydrography: 2,016 square miles of area sounded, 2,377 miles run while sounding, 26,514 soundings, 3 tide stations established, 10¾ hydrographic sheets finished.

At the beginning of the fiscal year the steamer *Pathfinder* was engaged in the survey of the southeast coast of the island of Mindanao in the vicinity of Mayo Bay, where operations were continued until July 27. The steamer then proceeded to Davao Gulf for the purpose of connecting the triangulation previously executed with a base line that had been measured in Pujada Bay on the east coast of the island. Stations Samal and Sigaboy of the previous work were

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recovered and re-marked and triangulation signals were erected over them. The triangulation connecting Davao Gulf with Pujada Bay was finished by August 15 and work was resumed on the southeast coast of Mindanao between Luban Island and Cape San Augustin. When this was completed the survey to the northward of Mayo Bay was again taken up. From September 7 to October 6 work was in progress between Manay and Baculin Point. Owing to a reported uprising among the mountain tribes back of Baganga it was regarded as unsafe to send parties into the interior and the season's work in this locality was then closed.

A severe typhoon was experienced on October 15 and 16 while in Cebu Harbor. Although many vessels were lost the *Pathfinder* suffered no serious damage. The two launches belonging to the vessel were sunk, but one of them was afterwards recovered.

During the storm the crew of the *Pathfinder* rendered valuable assistance in saving life and property at great personal risk.

On October 23 work was taken up on the unfinished portion of the west coast of Negros between Binalbagan and Sojoton Point. While engaged in this region the steamer encountered three typhoons, one of which made it necessary for the vessel to put to sea, as a harbor could not be reached. On December 5 the survey of the west coast of Negros was finished, and on December 19 the vessel sailed from Manila for Hongkong for necessary repairs.

At the beginning of the calendar year the steamer *Pathfinder* was at Hongkong and arrangements were in progress for making extensive repairs, a special appropriation of $20,000 having been made for the purpose. All the repairs were satisfactorily completed on April 2 and on April 8 the steamer left Hongkong for Manila arriving there on April 11. The steamer arrived at the working ground on May 18 and field operations were commenced the following day.

A base line of 4,470 meters in length was measured at the head of Bislig Bay on the east coast of Mindanao from which a triangulation was extended northward as far as Lamon Point.

The topographic work was completed from Point Sanco to a point about 6 miles northward of the mouth of the Ninatuan River. The inshore hydrography was completed between Point Sanco and Lamon Point and the offshore work was carried from Point Sanco to the junction of the previous work in Lianga Bay and extending offshore approximately 20 miles. At the close of the year this work was still in progress.

[W. M. HILL.]

STATIONS OCCUPIED.—Atimonan, Antipolo, Boac, Butuan, Calapan, Calbayog, Catbalogan, Cebu, Cujo, Davao, Iligan, Lucena, Masbate, Misamis, Puerto Princesa, San Jose de Buenavista, Surigao, Tacloban, Vallehermosa.

The magnetic survey of the Philippine Islands begun during the last fiscal year was in progress on July 1.

In the execution of this work an attempt was made to relocate and reoccupy old stations that had been established many years previously. In many cases the marks could not be found and owing to the destruction of the reference points there was not sufficient data to relocate the exact spots where observations had been made. Whenever conditions were favorable, however, observations were made so

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near to the old locations as not to practically affect the secular variation or change.

Observations, practically at the old locations, were made at San Jose de Buenavista, Vallehermosa, Cebu, Misamis, Suriagao, Iligan, Davao, Boac, Atimonan, Romblon, Calapan, Masbate, Calbayog, Tacloban, Catbalogan, Cujo, and Puerta Princesa.

In addition to the occupation of old stations, in cases where the locations were not suitable for future observations, new stations were established at Misamis, Iligan, and Calbayog. The stations Butuan and Lucena were established at places not before occupied.

The magnetic declination obtained at the town of Masbate on the east coast of Masbate Island was about 1° east, while it is said that on the west coast the variation is from 4° to 7° at certain points.

Magnetic work in the Philippine Islands was closed by the observer on February 20.

PORTO RICO.

[R. L. FARIS.]

In March and April the inspector of magnetic work inspected the instruments, equipment, and operation of the Coast and Geodetic Survey Magnetic Observatory at Vieques, P. R., and found them to be in good condition and working satisfactorily. The buildings are in good condition and well cared for.

[C. F. WOODYARD, GEORGE HARTNELL, and FRANK NEUMANN.]

This observatory was in charge of Mr. C. F. Woodyard, magnetic observer, until his death on December 31. Work was suspended until the arrival of another observer, Mr. George Hartnell on January 18. Mr. Frank Neumann assumed charge on February 18.

The magnetograph and seismograph were in satisfactory operation throughout the year, with the exception noted, and the required scale-value determinations, absolute observations, time, seismological, and meteorological observations were made.

Special rapid-rate registration was made on specified-term days from July to October in conformity with requests for international cooperation in connection with the Australasian Antarctic expedition, at that time engaged in magnetic work in the south polar regions. Special observations were also made at the time of the solar eclipse of October 10, 1912. Observations were made to secure additional data for an investigation concerning the cause of different values of Z-scale value resulting from deflections at different distances, and measurements were made for a further investigation of D-scale value.

About 30 earthquakes were recorded during the year.

HAWAIIAN ISLANDS.

[J. C. GAUGER.]

SUMMARY OF RESULTS.—Triangulation: 49 square miles of area covered, 10 stations occupied for horizontal measures, 10 stations occupied for vertical measures, 28 geographic positions determined, 12 elevations determined trigono-

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metrically. Topography: 15 square miles of area surveyed, 28.4 miles of general coast line, 2 miles of shore line of creeks, 1 mile of shore line of ponds, 48.4 miles of roads, 3 topographic sheets finished.

The triangulation on the north coast of the island of Maui, completed during the season of 1912, measures 14 miles along its axis and covers an area of 49 square miles. The work is connected with four stations of the territorial survey. The original marks at many of these stations have been lost.

The unsurveyed shore line on the north coast of Maui from Huelo to Kahului was completed by August 28, together with the inshore topography needed for chart purposes. The work was done on scales of 1/20,000 and 1/10,000.

After closing work on the island of Maui preparations were begun for the survey of the island of Hawaii.

[E. R. HAND.]

SUMMARY OF RESULTS.—Triangulation: 75 square miles of area covered, 87 signal poles erected, 27 stations occupied for horizontal measures, 3 stations occupied for vertical measures, 50 geographic positions determined. Topography: 23.5 square miles of area surveyed, 99.3 miles of general coast line, 110 miles of roads and railroads, 7 topographic sheets finished.

The triangulation and topography of the island of Hawaii was taken up by this party in continuation of the work begun by Assistant J. C. Gauger. Operations were commenced in the vicinity of Hilo.

In the triangulation the lines of the old Hawaiian government survey were used in bases from which supplementary points were determined for topographic control, and from the old and new stations intersection stations were located with a view to future use as hydrographic signals. All of the old stations were re-marked and descriptions of them prepared. In the topography two sets of plane-table positions were determined with a view to their use by hydrographic parties. For this purpose were chosen conspicuous objects on cliffs, natural or artificial, and also points along the water line which can be identified in future and whitewashed or otherwise marked.

Points determined by the Coast and Geodetic Survey in 1900 which have been removed and rebuilt were relocated trigonometrically. Of these Alia Point Light was the most important. Improvements at Hilo Harbor were located on a topographical sheet.

By December 31 work was completed as far as the town of Laupahoehoe.

At the beginning of the year the party was engaged in extending the triangulation from a primary line of the old Hawaiian system into the Laupahoehoe Valley for the control of the survey of that valley and for the location of a new lighthouse to be constructed there, and for this purpose three triangulation stations were established.

Continuing westward along the coast secondary stations were established along the sea, based on the Hawaiian triangulation, for the topographic control and for use as checks.

In Kohala the primary line Puu o Nale to Kauhola was chosen and the scheme extended eastward as far as the islands of Honokea Gulch and westward so as to control the northwestern extremity of the island.

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All prominent artificial objects useful as aids to navigation or for hydrographic signals were determined by triangulation. All old primary stations near the coast were re-marked where necessary. Photographs were made to aid in the identification of the higher and more conspicuous stations.

The shore line was completed a point east of Hilo westward to the town of Kawaihae. Prominent objects were located and signals erected for hydrographic work.

Progress westward from Waipio Valley was made difficult by the high cliffs. Working westward from the Waimanu Valley the way was barred by a point jutting out into deep water. This difficult stretch of cliff line was finally completed, however.

[J. B. MILLER, Commanding Steamer *Patterson*.]

SUMMARY OF RESULTS.—Hydrography: 991 square miles of area covered, 1,986 miles run while sounding, 14,266 soundings, 5,499 positions determined, 2 tide stations established, 8 hydrographic sheets finished. Physical hydrography: 15 current stations occupied, 433 readings of current pole, 543 surface temperatures observed.

Between November 27 and March 31 the Steamer *Patterson* was engaged upon surveys in the Hawaiian Islands, and during that period completed the hydrography of the windward side of Maui Island, and a portion of Penguin Bank, off the southwestern part of Molokai Island.

The topography of Maui Island having been recently revised, it was possible to begin the work of sounding at once, using the signals erected by the topographic party. Work was begun at the limit reached by the steamer *Pathfinder* in 1900 at Kaanapali Landing (Kekaa Point), west Maui, and from there the inshore sounding and also the offshore sounding to a distance of 6 to 11 miles from the shore, was completed along the northwest, north, northeast, east, and southeast coasts as far as Kaupo Landing on the southeast coast, a distance of 76 miles. Included in the survey, among other features, were the approaches to Kahului, the entrance and anchorage at Hana Cove, and several other landings of more or less importance or interest. For a distance of 21 miles on the south coast of Maui the hydrography is incomplete. This portion is uninhabited and has no ports or landings. Sounding work was done off the island of Molokai, on Penguin Bank, and an area of about 20 miles long and 7 miles wide was covered, lying directly in the track of interisland shipping.

In the offshore soundings the lines were spaced at the following intervals: 25 to 35 fathoms, one-sixth mile; 35 to 100 fathoms, one-third mile; 100 to 300 fathoms, 1 mile; 300 to 1,000 fathoms, 2½ miles. On doubtful spots and shoals special developments and detached soundings were made. Soundings were generally spaced at the same intervals along the lines except at critical places where they were spaced one-sixteenth mile and closer. For the inshore soundings the lines were spaced one-eighth mile apart on the average and generally not crossed; at critical or important places they were much closer and were crossed; in Hana Cove they were run one thirty-second mile apart in both directions.

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Tides were observed with an automatic gauge at Kahalui Harbor on the north coast of Maui Island throughout the season, and a continuous series of one week was obtained at Hana Cove for comparison. The tides are very small and of little interest or importance except in Kahului Harbor, where the large ships have very scant depth for loading and sometimes load to within 1 or 2 feet of the bottom. The seiches and so-called tidal waves are of more importance. No tidal wave was registered on the gauge, but the seiches were registered continually, having a period of about one-third to one-half hour and a range of one-half to 1½ feet.

Current observations were made at 15 stations around Maui and Molokai Islands. The results showed a strong current from the south, setting against the prevailing wind; on the east and west extremity of Molokai Island this current has a strength of 1 to 2 knots, while along the northern and southern coasts it is weak and variable. The tide causes a slack in this current but does not reverse it, and the wind has little effect on it, but it seems to be affected by disturbances of the barometer.

[J. W. GREEN.]

The regular series of observations were continued at the Honolulu Magnetic Observatory during the year. The magnetographs recording declination, horizontal intensity, vertical intensity, and temperature were in continuous operation. Special rapid-rate registrations were made on specified days. Hourly scalings were made from the magnetograph traces for each of the elements as well as maximum and minimum values for each day.

Absolute observations for the purpose of base-line determination were made once each week. Scale values of the variometers were determined once each month.

The Milne seismograph was kept in continuous operation. The sensibility and period of the pendulum were determined at intervals.

Meteorological observations were made each day, and transits of stars were observed each week for chronometer corrections.

SPECIAL DUTY.

NEW YORK.

[E. G. FISCHER and G. W. CLARVOE.]

In July an inspection was made of the tide station at Fort Hamilton, N. Y., and necessary repairs were made to the tidal indicator. A new float was installed and the indicator was adjusted and tested while in operation.

The electric indicators at the Maritime Exchange and the Seamen's Friend Society's Institute in New York were also inspected.

In September the electrical tide indicator at the American Seamen's Friend Society's Institute which had been put out of action by the cutting of an electric cable was thoroughly repaired and put in working order.

The tide staff at the end of Pier 51, which had been destroyed, owing to its exposed situation, was not replaced. The electric cable was repaired and proper connections made.

This work was done between September 5 and 9.

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MARYLAND.

[CHAS. C. YATES.]

Work was continued during the year in cooperation with the oyster survey commissions of the States of Maryland and Delaware.

The work in Maryland consisted in the preparation for publication of charts showing the location of the oyster beds and of technical reports resulting from the survey of oyster beds.

The report and charts for Talbot County and Dorchester County were completed and filed with the Maryland Courts and the Maryland Shell Fish Commission, thus opening to the public for the purposes of oyster culture the last oyster producing counties of the State covered by the work of the Maryland Oyster Survey. These reports were afterwards published.

Progress was made in the preparation of a summary and index of all the publications of the Maryland Oyster Survey.

For the Delaware Oyster Survey Commission a chart was prepared showing the plotted positions of all the new leased bottoms of 1911 and 1912 in addition to those of the original survey of 1910. This chart was signed by the commissioners and filed with the State librarian. A duplicate chart was retained to be filed in the archives of the Coast and Geodetic Survey. A report of work done by the commission was prepared and published.

The officer in charge of this work laid out a marine trial course off Kent Island in Chesapeake Bay by request and at the expense of the Maryland Steel Co.

The trial course was established by measuring a base line on land exactly 1 nautical mile in length, which was parallel to the trial course in the water, and then marking the ends of this nautical mile base by range marks, at exactly right angles to the direction base, thus intercepting an exact nautical mile on the line of the trial course in the water.

In accordance with instructions from the Superintendent the geographic position of the wireless station at Sparrow Point, Md., was determined; and afterwards a similar determination was made of the position of the Marconi wireless tower on the American Building in the city of Baltimore.

During the six months from January 1 to June 30 the preparation of two publications, "Report of Delaware oyster survey commission" and "Summary of survey of oyster bars of Maryland 1906–1912," was completed, and the preparation of records of triangulation, hydrographic and other field work of the Maryland survey for filing in the archives of the Coast and Geodetic Survey at Washington was continued. In the course of this work many calls for geographic information were met at the office in Baltimore, consultations were held with officials of the States of Maryland and Delaware on matters relating to oyster surveys, and other miscellaneous duties were performed.

At the end of the fiscal year the only work remaining to be done was a small amount of office work connected with the publications of the Maryland and Delaware surveys and the completion of the triangulation and hydrographic records for filing in the archives of the survey at Washington.

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DISTRICT OF COLUMBIA.

[H. G. AVERS.]

Between February 21 and March 5 a line of levels was run to determine the elevation of a point near the new seismological observatory of Georgetown University. Two rodmen and a recorder, students of the university, were provided for this work without expense to the Government.

The elevation is based upon a bench mark of the District of Columbia topographical survey located near the university grounds and about one-half mile from the observatory. The line of levels was run forward and backward between the two points.

[GEORGE D. COWIE.]

SUMMARY OF RESULTS.—Topography: 5 square miles of area surveyed, 1 topographic sheet finished.

At the request of the Supervising Architect of the Treasury Department a topographic survey was made between November 25 and December 17 of the grounds of the Hygienic Laboratory, Washington, D. C., elevations being determined at intervals of 10 feet over the entire ground. This necessitated running a preliminary line of levels between established bench marks of the District of Columbia survey and a temporary bench mark on the laboratory grounds.

The extreme difference of elevation was about 70 feet. Levels were run in loops so that a check was obtained on each section of the work. A plat of the survey was completed giving elevations every 10 feet, 10-foot contours, boundaries, and bench marks.

[O. B. FRENCH.]

SUMMARY OF RESULTS.—Reconnoissance: 75 square miles of area covered, 35 lines of intervisibility determined, 11 points selected for scheme. Base lines: Secondary, length of 2½ kilometers. Triangulation: 75 square miles of area covered, 11 signal poles erected, 11 stations occupied for horizontal measures, 35 geographic positions determined. Leveling: 25 elevations determined by leveling, 7 miles of levels run.

In September work was begun on a triangulation undertaken at the request of the Department of Justice for the purpose of accurately locating and marking in a permanent manner the line of Florida Avenue. While the monuments were being placed under the direction of the surveyor of the District of Columbia, a reconnoissance was made and a comprehensive scheme of triangulation was executed covering the principal portion of the District of Columbia and connected with primary stations Hill, Capitol, and Theological Seminary. A number of intersection stations were observed and points located as near Florida Avenue as possible for the purpose of connecting the traverse along Florida Avenue with the triangulation.

By the time the triangulation was finished the stone monuments had been set and the measurements between them were proceeded with. These monuments were placed so that the adjacent stones are intervisible, 5 being on the north side of Florida Avenue and 15 on the south side. Most of them are set in the sidewalk and all are in

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the space between the curb and the property line. The stones are of granite 8 by 8 inches and 4 feet long set in concrete with top 4 to 6 inches below the sidewalk or ground. Each is covered with a cast-iron box with a lid which is set in the ground so as to afford ready access to the top of the stone and to protect the mark from wear and possible disturbance. The center of each station is indicated by a regular triangulation station mark set in a drill hole in the top of the granite post. Each is a bench mark as well as a station mark. The distances between the monuments were measured with an invar tape.

Precise levels were run in both directions over the whole line and each end connected with bench marks of the Coast and Geodetic Survey. At the east end a complete circuit was run in both directions from the Capitol bench mark along North Capitol Street (connecting with the Printing Office bench mark) to Florida Avenue, to Fifteenth Street East and returning via Maryland Avenue to the Capitol bench mark.

After getting the connection between the measured line along Florida Avenue and the triangulation a small discrepancy in the measures was developed, making necessary the introduction of a base line into the scheme. A base was accordingly measured in Potomac Park just southeast of the railroad. It was measured with two invar tapes and satisfactorily connected with the triangulation. The final connection between the traverse and the triangulation is not yet entirely completed. A number of points used by the United States Engineers in their work around the harbor were determined in position by triangulation.

On June 16 work was begun on a revision of triangulation of the Potomac River between the Aqueduct Bridge and Little Falls and six stations were selected. This work was in progress at the end of the month.

VIRGINIA.

[Earl F. Church.]

In October, in accordance with the arrangement made with the Bureau of Lighthouses, the light vessels at Winter Quarter Shoal and Fenwick Island Shoal were visited; apparatus for making current observations was installed and instructions were given the masters of those vessels as to the method of making the observations desired. It was intended that the series of observations should continue for three months. Transportation was furnished the officer on this duty by the lighthouse steamer *Orchid*.

[H. A. Seran.]

In March and April a number of objects on the north shore of Hampton Roads were determined in position for the use of ships anchoring in the naval anchorage grounds in Hampton Roads.

The objects determined are prominent chimneys, church spires, houses, and other objects readily identified.

The triangulation of the southern branch of Elizabeth River was connected with that of Hampton Roads.

The position of the Bayville chimney in the vicinity of Cape Henry was determined by triangulation. This work was closed on April 22.

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MISSISSIPPI RIVER COMMISSION.

[H. P. RITTER.]

As authorized by law an officer of the Coast and Geodetic Survey continued to serve as a member of the Mississippi River Commission in addition to his other duties, and attended the meetings of the commission held at St. Louis, Mo., in July, August, and October.

INTERNATIONAL BOUNDARIES.

[O. H. TITTMANN, *Commissioner.*]

UNITED STATES AND CANADA BOUNDARY.

[C. H. SINCLAIR.]

SUMMARY OF RESULTS.—Base lines: 1 base line measured. Triangulation: 550 square miles of area covered, 3 signal poles erected, 12 observing tripods and scaffolds built, 24 stations occupied for horizontal measures. Line measure and monumenting: 15 miles of double measure with invar tapes, 19 monuments set on bounding (including 2 reference monuments).

Work on the forty-ninth parallel boundary between the United States and Canada east of the Rocky Mountains, between the Red River of the North and Lake of the Woods, was resumed in May, 1912.

Work was begun at the terminal line of the Canadian work of the preceding season about 1 mile west of the Red River, and by June 30, 10 stations in the main scheme of triangulation and 9 subordinate stations had been occupied, and 9 signal poles and 7 scaffold signals erected.

The banks of the Red River in this region are lined with tall cottonwood trees through which it was necessary to cut in order to clear the lines of sight. A central point, the cupola of the town hall at Emerson, saved the clearing of two diagonals in the quadrilateral. From a distance of 12 miles from Red River to the Lake of the Woods the country is covered with forest timber, necessitating the use of signals from 20 to 90 feet in height for the triangulation. The distance between the monuments east of No. 58 was measured with a 50-metar invar tape, and the monuments were occupied to carry along the azimuth. It was found impracticable to accurately determine the positions of monuments in the woods in any other way.

Between monuments 65 and 54 connection was made with the line States-Canada, the terminal of the ninety-eighth meridian triangulation by means of a 7-mile line Humboldt-Orleans, forming a quadrilateral to the south, and incorporating the line Furney-Joe, the south side of a quadrilateral in the regular scheme. This line, 11 miles long, was used as a base for the triangulation near Red River, and saved the measurement of a base and azimuth.

Transportation was difficult owing to the swampy nature of the ground traversed and the absence of good roads.

East of the Roseau River it was necessary to expand the scheme of triangulation and increase the height of the towers.

As a terminal base nearly 6 miles long had been measured along the Canadian railway running north out of Warroad across the boundary it was thought best to occupy the base points first. The

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signals were first raised to a height of 70 feet, and later on South Base was carried up 90 feet in order to see over the tall trees to the west and reach points about 20 miles distant on the shores of Lake of the Woods and furnish a line for the Canadian triangulation that was being carried from the North West Point, along the Water boundary, to the mouth of Rainy River.

Eight towers from 65 to 90 feet in height were erected by a special signal building party. Sixteen signals from 30 to 55 feet high and one 22 feet high were put up by the members of the regular triangulation party. A signal pole 100 feet in height was erected over astronomical station Sprague. The latitude and longitude of Sprague, which is about 2 miles north of the boundary, were determined by the Canadian surveyors.

Monuments were taken to their final sites in the spring of 1912, together with sand for setting them, but the cement could not be left exposed so long and was taken in at the time that the monuments were set. This proved a laborious task where horses could not be used.

An azimuth was determined at South Base, Warroad, early in October, and referred to Buffalo Point, 6.5 miles distant, a station in the triangulation.

After the reconnoissance and signal building were completed to the west edge of the Lake of the Woods, it was found that two lines were obstructed by tall trees on a ridge about 3 miles west of the Warroad base, and owing to the lateness of the season the clearing of these lines was not attempted and work was closed early in November.

In March two members of the party were sent to Warroad to set monuments on the meridian boundary before the melting of the ice, and also to place monuments at right angles to the meridian for the purpose of marking the intersection of the north and south boundary and the boundary running southeastward. The position of this intersection point had been temporarily located by Mr. E. C. Barnard in 1912. On the ice there was very little difficulty in finding this point and locating it permanently by means of reference monuments in firm ground. These reference monuments are similar in every respect to the regular boundary monuments except that they have no lettering on them but the words "Reference Mark."

The meridian line from monument 1 to monument 7B was measured twice with an invar tape. Four monuments were set on the Parallel Boundary. Good foundations were found for all of these monuments by digging down to firm clay.

One observer had charge of the triangulation and tape measurement necessary to fix the position of the North West Angle, and another had charge of the reconnoissance, transportation, and signal building. At Fort Frances a base was laid out and a tower 80 feet high was erected at each end. Towers were built on Lake of the Woods at stations Gould, Long Point, and Big and poles were erected at Burton and Oak to furnish control for the topography as far as the mouth of Rainy River. The heights of the towers constructed ranged from 60 to 85 feet.

In order to complete the triangulation of the forty-ninth parallel west of the Warroad base a tower was erected and occupied at Guibo, and Sandy and Salol were reoccupied to strengthen the determination

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of Sprague, the Canadian latitude and longitude station. The tower at West Base, which had been destroyed by a storm, was reerected; three towers were constructed in the vicinity of Rainy Lake, and a reconnoissance was made down Rainy River.

All of the observations at the stations on Lake of the Woods were completed by June 20.

On June 25 a base 8,062 meters in length was measured along the south rail of the Canadian Northern Railway west of Fort Frances, Ontario, using two invar tapes, the measurements being made in opposite directions.

Mr. I. Pounder, representing the British commissioner, assisted in the base measurement.

An inspection was made of the entire length of Rainy River to obtain information necessary for the extension of the triangulation.

[E. C. BARNARD.]

SUMMARY OF RESULTS.—Reconnoissance: Length of scheme 15 miles, 9 points selected for scheme. Triangulation: Primary, 9 stations selected, 2 signals erected, 6 primary and 12 secondary stations occupied for measurements of horizontal angles. Leveling: 155.5 miles of levels run, 74 permanent and 100 temporary bench marks established. Topography: 209.5 square miles of area surveyed, 95 miles of topographic belt along boundary, 100 square miles of plane-table triangulation. Boundary location: 102 miles of boundary located, 82.5 miles of vista cut, 76 monument sites recovered, 14 new monument sites located. These statistics include some work done in the spring of 1912.

The work of surveying and marking the boundary between the United States and Canada east of the summit of the Rocky Mountains was in progress at the beginning of the fiscal year. The work of this party included the topography, interpolation of monument sites, vista cutting, and leveling. During the season of 1912 these operations were completed from monument 70 on the west bank of Red River to monument 1 on the west shore of the Lake of the Woods and from the northwestern point of Lake of the Woods south to monument 7A. A part of this work has already been mentioned in the last annual report.

On June 30 the topographic work had advanced to monument 31, a distance of 39 miles along the boundary, 78 square miles having been mapped; the leveling to monument 25, a distance of 44 miles along the boundary, 88 miles of levels having been run; and the vista cutting to monument 28, 41 miles along the boundary. During the months of February and March preceding the iron monuments, weighing 400 pounds apiece with the necessary sand for the concrete foundation, nearly 1 ton in all to each monument, had been placed at the monument sites between Great Roseau Swamp and Lake of the Woods, the swamp being impassable for horses in the summer.

On July 17 the chief of party proceeded to Warroad, Minn., and had a conference with the Canadian surveyor, Mr. J. J. McArthur, and with him inspected the conditions at Northwest Angle, Lake of the Woods.

During the temporary disability of the levelman, Mr. J. L. Rannie, the Canadian surveyor, rendered valuable aid in the leveling work. Some triangulation stations were selected and signals were erected on the western shore of the Lake of the Woods. Assistance was ren-

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dered to the American party engaged in measuring base lines along the boundary and also to the party engaged in signal building for the triangulation party.

All of the work on the forty-ninth parallel was completed on September 18 and the party proceeded to Warroad, Minn., on the Lake of the Woods, where power boats were hired for the transportation of the party and supplies. Instructions had been received to make a detailed map of the section of the Northwest Angle extending from the northwest point to monument 1. Diligent search was made for some mark in the vicinity of the northwest point, the location of which was determined by measuring from monument 1 the distance recorded in the report of the former commission, but nothing was found but a tripod 350 feet northwest of the point, erected in 1872 by the former commission, and which was still standing.

While camped on Harrison Creek, a base line 2732 feet in length, for control of the detailed map on scale of 400 feet to 1 inch, was measured with an invar tape, and a plane-table triangulation was expanded to the northwest point. A flag was set in the center of the channel on the extension of the north and south line from monument 1 to mark the most southerly intersection of the water boundary with the north and south boundary line, and a second flag was erected to mark the north and south boundary line near the northwest point. Toward the end of September a trip was made to the boundary line crossing on Stony Creek and the vista along the boundary cut in 1873 was found to be still clear of timber. On September 4 and 5 soundings were taken in the channel of Bear Creek, and the soundings were located on the plane-table sheet.

From monument 7 southward to the point where the north and south boundary line intersects the Lake of the Woods, a distance of 7 miles, the vista along the line had been cut, but apparently no permanent marks had been left and no record of any marks nor of distances on this section of the boundary is to be found in the report of the former commission. It was therefore necessary to extend the north and south boundary line and to locate additional monument sites to the south. For this purpose a 20-foot tower was erected over the site of monument 6 which stood on a high granite ledge. From the top of this tower monument 7 to the south as well as the signals erected over monuments 5, 4, 3, 2, and 1 were visible. The vista cutting was extended to the south across Stony Creek and the monument site for 7B was located by the extension of the line north of monument 6. The site for monument 7A, which was not visible from the tower at monument 6, was located by a line of sight from monument 7 to monument site 7B. The triangulation stations—New Rice, Old Rice, Pine, and New Loon, which had been established by the Canadian party in connection with the survey of the water boundary and monument 1, were occupied by the Canadian surveyor, Mr. J. L. Rannie, to connect the north and south boundary line with the system of triangulation through the lake as well as to determine the position of the flag marking the intersection of the water boundary with the north and south line. Observations of azimuth were made by the same officer at the triangulation station New Rice to determine the azimuth of the north and south boundary line. The distances between the monuments on the north and south line were measured with an invar tape.

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On October 16 the levelman and one hand were sent westward along the boundary to determine and stamp all of the permanent bench marks that had been set in the monuments up to that date. Supplies of sand were placed at the point on Stony Creek selected for winter operations.

The main party was disbanded about the middle of October, but some field work of leveling and topography was done until December 1. During the winter the placing of monuments and of cement and sand for the concrete foundation was continued.

In January, 1913, the work was begun of transporting to the proper localities the cast-iron monuments and sand and cement for the foundations on the north and south boundary line from the northwest angle south to the Lake of the Woods, and the distances along the boundary between the monuments were measured in both directions with an invar tape under tension. After the completion of this work certain monuments were transported to their proper positions on the forty-ninth parallel boundary line and a 20-foot vista was opened along the north and south boundary from monument 7C south to the Lake of the Woods, a distance of 4½ miles. Bench marks were established at a distance of 5 miles apart for the entire length of Rainy Lake and Lake Namakin and a bench mark was established on Lake of the Woods near Zipple. The elevations of these bench marks above the water level of the lake were determined by leveling. Tide gauges at Warroad on Lake of the Woods, at Ranier on Rainy Lake, and near Kettle Falls on Lake Namakin were read during the operation of placing these bench marks. Some of the leveling was done at a temperature of 40° below zero, Fahrenheit.

A level line was also run from the tide gauge near Kettle Falls at the head of Rainy Lake to the tide gauge on Lake Namakin, a distance of 3 miles.

After the completion of the work mentioned and the location of the boundary from monument 7C to the shore of the Lake of the Woods the topography along the north and south boundary line and along the shore westward from Stony Point was taken up.

Work was completed to the Lake of the Woods on June 18 and was begun on Rainy Lake on June 24.

Triangulation was begun on Rainy Lake on June 1 and by the end of the month the reconnoissance had been completed as far as Brule Narrows about halfway up the lake.

A detailed survey on a scale of 1/5,000 was made of the portion of Rainy River extending below the dam at International Falls to above the railroad bridge at Ranier. For the control of this work a base line 4,000 feet in length was measured and the triangulation extended to locate the necessary boundary reference points along the river.

By the close of the year the topographic mapping was completed along the north and south boundary line from monument 7C to Lake Shore and from Stony Point along the west and south shore of Lake of the Woods to and including the mouth of Rainy River, scale 1/45,000, a distance of 70 miles along shore. A detailed topographic map of Four Mile Bay, mouth of Rainy River, Lake of the Woods, on a scale 1/20,000, were also completed.

Mr. I. R. Pounder, representing the British commissioner, joined the party on June 10 and assisted in the triangulation.

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[O. B. FRENCH.]

SUMMARY OF RESULTS.—Base lines: 10 secondary, measured, aggregate length 29,391 meters. Triangulation: 27 square miles of area covered, 31 signal poles erected, 28 stations occupied for horizontal measures, 21 stations occupied for vertical measures, 13 geographic positions determined, 12 elevations determined trigonometrically. Leveling: 600 elevations determined by leveling, 18.02 miles of levels run.

The party engaged in measuring base lines on the boundary between the United States and Canada was on July 1 engaged in the final details connected with the measurement of a base at Souris, S. Dak. From this place the party went to Sherwood, N. Dak., where an extra base was measured and connected with the line Morse to Center about 10 miles west of Sherwood. This base was made necessary by failure to recover the stations selected before taking the field. The next base measured was at Portal, N. Dak., after which in turn were measured the Ross, Knute, Ogden, Green, Sowers, Kirk, St. Marys, and Warroad bases, the last being completed August 26. An officer was engaged in completing the levels along the Warroad base until the end of August.

All base lines were measured with invar tapes which were standardized before and after the field work. They were used with supports at 25-meter intervals on most of the bases. When the wind was strong two extra supports were inserted, making the intervals 12½ meters. Where the bases were measured along a railroad the tape rested along one of the rails for its whole length.

A double line of levels was run over each base line to give elevations for reduction to a horizontal line and also for reduction to sea level, vertical angles being also measured for this purpose when necessary.

All base lines were carefully marked with both surface and underground marks.

[F. D. GRANGER.]

SUMMARY OF RESULTS.—Hydrography: 27 square miles of area sounded, 264 miles run while sounding, 908 positions determined, 11,397 soundings, 2 permanent and 5 temporary tide stations established, 4 hydrographic sheets finished.

The party engaged in the survey of the boundary between the United States and Canada from the northwestern angle of Lake of the Woods and to the southward along that lake was in the field at the beginning of the fiscal year. This party was under the charge of Mr. J. J. McArthur of the Canadian boundary survey. Mr. F. D. Granger, who had been detailed to this party as the representative of the United States commissioner, remained on this duty until the close of the season in November.

On July 1 the survey of the boundary had been carried only a few miles down Northwest Angle Inlet from the starting point at Northwest Angle. Weather conditions were generally unfavorable to such a degree as to retard the progress of the work. The entire distance along the boundary covered by the triangulation and topography was 25 miles.

In addition to the triangulation above mentioned a larger scheme expanding from the smaller in the vicinity of American Point and Oak Island was planned, but little progress was made in its execution. One of the objects of the larger scheme was to cover the lower por-

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tion of the lake and at the same time make connection with the boundary triangulation in the vicinity of Warroad, Minn., and Buffalo, Ontario, brought from the west along the forty-ninth meridian by one of the American boundary parties.

Following the small scheme of triangulation along the boundary reference marks for defining the exact position of the line were placed at various points between Northwest Angle and the easternmost point of Oak Island (Island No. 1).

As the precise location of the boundary from Island No. 1 to the north of the Rainy River depends upon the interpretation the commissioners may put upon the wording of the treaty defining it, no reference marks were set below the easternmost point of Island No. 1.

The reference marks used, all of which were connected with the triangulation, were bars of iron 2 inches square and 45 inches long, with sharp pyramidal top, and were each set in a bed of concrete 2 feet square by 3 feet deep.

While the other work was in progress a hydrographic survey of the lake along the boundary was made by the American surveyor.

Mr. Granger returned to Warroad on April 29 to make preliminary arrangements necessary for resuming field operations.

Field work was begun on May 27 at Bear Island, Ontario, and from that date to the close of the fiscal year the triangulation, topography, and hydrography were advanced as rapidly as possible.

[W. B. FAIRFIELD.]

SUMMARY OF RESULTS.—Reconnoissance: 50 points selected for scheme. Triangulation: 29.2 square miles of area covered, 282 stations occupied for horizontal measures, 107 stations occupied for vertical measures, 347 geographic positions determined, 196 elevations determined trigonometrically. Azimuth: 4 azimuth stations occupied, azimuth observed on 9 nights. Topography: 45 square miles of area surveyed, 41.5 miles of boundary surveyed, 81.15 miles of shore line of rivers and creeks, 12 topographic sheets finished.

The party engaged in the survey of the international boundary between the United States and Canada from Pigeon River and the Lake of the Woods was in the field at the beginning of the fiscal year. The work had been resumed on June 9 on Round Lake and was carried on continuously until October 29, when the party was disbanded at Prairie Portage on North Lake.

The triangulation was taken up at Round Lake and continued to the westward as far as the western end of Knife Lake, including all of the lakes, rivers, connecting streams, and divides along the boundary. Owing to the dense growth of timber it was necessary to reduce the size of the scheme in several places, and much cutting was necessary at nearly all of the stations.

Saganaga Lake is a large irregular-shaped body of water with large bays extending to the east into Canada and to the south into Minnesota. It is the largest lake along the boundary west of Lake Superior and contains many islands. The shores of the lake are steep and rocky with wooded bluffs from the water's edge. Several soundings were made in the main part of the lake, the greatest depth recorded being 104 feet.

Swamp Portage across the southern part of Hunters Island and connecting Swamp Lake with Cypress Lake leads over a rocky ridge

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60 feet high at its highest point and heavily wooded; it is about 420 meters long. There is no water communication between Swamp and Cypress Lakes, the portage trail being the most direct route between the two lakes. From Swamp Lake the water flows easterly into another small lake, thence into Saganaga, but the flow of water is very small. The waters of Cypress Lake flow westerly into Knife Lake. Cypress Lake is a very long narrow body of water with high rock cliffs on either shore. These cliffs rise to height of from 100 to 200 feet.

Little and Big Knife Lakes are virtually one lake, the connecting stream being some 60 meters wide and 200 meters long with no perceptible current. There are several large bays or arms extending from Big Knife Lake both into Canada and Minnesota, one especially large on the Minnesota side extending 4 or 5 miles below the boundary.

A dam was built about four years ago by one of the Minnesota lumber firms at the west end of Big Knife Lake which has raised the water level of the lake 4 or 5 feet.

The topography, consisting of the shore line of all the lakes, islands, rivers, and connecting streams, together with the topography of the portages and divides, was carried on at the same time with the triangulation. The scale of the survey was 1/20,000, but all narrow places, lakes, connecting streams, portages, and divides were surveyed on a scale of 1/5,000.

Observations for azimuth were made at triangulation stations Care, Camp Dolores, and Engle.

The triangulation stations were marked in a permanent manner, 85 with brass plates set in the rock, and 197 with drill holes in the rock with a triangle cut around them.

Mr. John J. Phelan, assistant surveyor, executed all of the topography and assisted in the other work of the party.

Work was resumed near Winton, Minn., on May 21 and was in progress at the close of the fiscal year.

[J. B. Baylor.]

Summary of results.—Line measure along boundary with invar tape 31.5 miles. Leveling: 37 miles of levels run. Topography: 33.37 square miles of area surveyed, 22 miles of shore line of creeks, 10 miles of roads, 6 topographic sheets finished. These statistics include work done in the spring of 1912.

The party engaged in the survey and monumenting of the portion of the international boundary line separating the State of Maine from the Province of Quebec was at work during the season of 1912 in the section between Lake Pohenagamook and the northwest branch of the St. John River. At the same time a Canadian party was at work on different portions of this section of the international boundary, which runs in a straight line for 64 miles through an almost unbroken forest.

The region is remote and transportation difficult, as the boundary line can be reached along the greater part of its length only by means of trails which had to be cut through the forest, crossing bottomless bogs in many places. The use of drags was necessary for the transportation of outfit and supplies.

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A 30-foot lane was cut through the woods along the boundary, the trees being cut off close to the ground and removed from this lane in order that the tape measurements might be made and the stakes necessary for the measures driven in position and their levels taken.

About every 800 or 1,000 feet along this straight line narrow lanes were cut through the forest at right angles to the boundary line for a distance of about 3,000 feet on each side of it in order to bring out the contours and other topographic features. During the progress of the work the American and the Canadian parties were in frequent communication.

The cast-iron monuments placed by the commission of 1842 were reset in cement with appropriate lettered cement bases, and additional cement monuments with similar bases were placed on the prominent hills, so as to be easily intervisible for the entire length of the line so far as completed. Forty-eight of the old cast-iron monuments were reset where necessary during the season. Field work was closed on November 18.

Work was resumed about the middle of May at a point west of the main branch of Black River. Topographic work, staking, and line measurement were begun May 26. By June 30, 9⅛ square miles of topography on a scale of 1/20,000 had been completed and 40 boundary monuments had been set. A 30-foot vista was cleared along the boundary as far as Quam River.

[J. E. McGRATH.]

SUMMARY OF RESULTS.—Reconnoissance: 18 square miles of area covered, 201 lines of intervisibility determined, 98 points selected for scheme. Base lines, secondary length of, 756 meters. Triangulation: 18 square miles of area covered, 83 signal poles erected, 82 stations occupied for horizontal measures, 134 geographic positions determined, 15 days occupied in marking and monumenting stations. Leveling: 619 meters of levels run. Topography: 2.5 square miles of area surveyed, 6 miles of general coast line, 16 miles of shore line of rivers, 2.4 miles of shore line of creeks, 1 mile of ponds, 4 topographic sheets finished.

The survey and marking of the boundary line between the United States and Canada in the valley of the St. Croix River was in progress at the beginning of the fiscal year near the mouth of Monument Stream.

Owing to the narrow water shed and densely wooded character of the country through which Monument Stream runs, it was impracticable to carry a scheme of triangulation more than 1½ miles up the stream. The last station for this class of work was Cropley, which is about 2,400 meters from North Lake. Between Cropley and Birch the distances depend upon a single triangle with a stadia-measured base. At Birch advantage was taken of the width of the valley to extend upward to Moose, another piece of triangulation, depending for lengths on a short base measured with a steel tape. From Moose a traverse line in which the distances were measured with a steel tape was extended to Poplar, a point located in 1891. The work was continued onward from Poplar by a traverse in which the distances were obtained by reciprocally measured stadia observations, checks being furnished by connection with Hornet determined by triangulation in 1891 and Poplar Mt. determined trigonometrically in 1912. These three stations divide the distance depending on traverse measure-

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ments symmetrically. The work closed on Poplar Mt., and later in the season the Canadian party measured a traverse line from the Initial Boundary Monument at the head of the St. Croix River to Poplar Mt. triangulation station and to Avernus, the latter being the last traverse station determined by the American party in 1912. At all of the regular stations in the triangulation and traverse work done by the American party signals were set up, and angles were measured at each point.

Flags were set along Monument Stream at the estimated center of each point and bay, and from each of the regular marked stations stadia readings were made and angles measured so that all of these flag-marked points were located. At each of the regular instrument stations along the stream a permanent mark was left except at two points, where the ground is swampy. At both of these stations, however, permanently marked points are not more than 200 meters distant. At most of the stations above Hornet the station marks are bronze bolts set in rock ledges, in bowlders, or in granite posts embedded in cement.

On the return of the party after closing work at Poplar Mt. boundary marks were set at points shown on the topographic sheets at Duck Point, mouth of Scott Brook, near the Steep Banks, near Meeting House Rock, opposite old Keene farmstead, and at Cabin.

At Grand Falls the St. Croix Paper Co. has begun the construction of a new power dam which will impound the river at the foot of the upper pitch of Grand Falls. Because of uncertainty as to the level to be reached by the back water at Spednic and of the danger that seems to threaten Spednic South and Spednic North station marks, Cabin station, on top of a rocky ledge 5.8 feet above Spednic South was referred to Spednic South and Spednic North, and a bronze bolt was centered in the ledge as a station mark.

At Calais connection was made between Harrison triangulation station and the monuments of a recent survey of property lines in the vicinity of Eaton's and Murchies' saw mills.

Besides the work mentioned 8 stations were occupied between Milltown, Me., and Milltown, New Brunswick, for location of additional structural and topographic details; a trip was made to Woodland, Me., to examine the condition of signals erected along the river in 1911; arrangements were made for a supply of cement and sand and for setting reference marks; and reference marks were established at station No. 11 and at three other points. On October 5 a visit was made to the site of the new dam to ascertain how near the structure would approach the station marks established in that vicinity and to obtain other necessary information.

Work in the field was closed on October 6.

On June 25 work was begun with a reconnoissance for the recovery of the stations which had been marked at various times at the head of the St. Croix River. Several signals were erected and connection was made by vertical angle measurements between the elevation at Pole Hill and points near the Initial Monument.

A plane-table survey was begun at the Initial Monument, which is intended to show the features of Monument Stream in all detail practicable on a scale of 1/10,000. The work was in progress at the close of the fiscal year.

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ALASKA BOUNDARY.

[THOMAS RIGGS, Jr.]

SUMMARY OF RESULTS.—Triangulation: 16 signals erected in main scheme and 3 at line stations, 77 stations occupied for horizontal measures, 73.75 miles of triangulation belt completed. Magnetic work: 6 stations occupied for observations of magnetic declination. Line projection: 25.6 miles of boundary line run. Topography: 341 square miles of area covered, 239 miles of traverse run, 47 miles of topographic belt completed.

The party engaged in the survey and demarcation of the northern part of the boundary line between Alaska and Canada along the one hundred and forty-first meridian resumed work in the spring of 1912 so that a portion of this work was done in the last fiscal year. In order, however, to give a connected account of what was done it will be necessary to recount briefly the movements of the boundary party previous to July 1, 1912.

At the close of the surveying season in 1911, owing to an epidemic of smallpox among the natives, none of the field parties were allowed to come to the Rampart House, and in consequence practically all of the stores for the following winter were piled on the bank of the Porcupine River. Mr. W. B. Reaburn, surveyor, was left in charge at Rampart House with five other men charged with the duty of storing the outfit during the winter and to forward such supplies along the boundary as would be needed in the spring. He was also charged with the issuing of supplies to the Indians and with taking the launch *Midnight Sun* out on the ways and making the necessary repairs. With him were left Dr. G. T. Smith, surgeon, a foreman, an engineer for the launch, a pilot, and a cook. During the early part of the winter the launch was repaired, the outfit overhauled, wood cut for fuel, and an inventory made of all stores and equipment.

The Canadian Government had built a hospital on Edmonds Island for the Indians affected with the smallpox in order that no one except the doctor should come in contact with them. Instructions were given the American party, with a view to maintaining a quarantine and preventing the spread of the disease.

On February 2 two men were sent to Fort Yukon from Rampart House with mail and instructions to bring back supplies. In early April supplies were taken out along the boundary trail as far as Surprise Creek and when the ice in the Porcupine River broke up the launch was dispatched with 10 tons of supplies for the Old Crow River. On the high water the *Midnight Sun* was able to get up this river to the point where the trail leaves the river and heads across the flats for Ammerman Mountain.

The temperature was carefully recorded throughout the winter, which was of unprecedented mildness, the lowest recorded temperature being only −50°. A copy of the record of temperature and precipitation was furnished for transmission to the Weather Bureau.

Under instructions from the commissioner, the chief of the boundary party left Washington March 26 and proceeded to Ottawa for a final conference with the Canadian boundary surveyor. From Ottawa he proceeded to San Francisco, where arrangements were made with the Northern Navigation Co. for the transportation of men, supplies, and horses from Dawson to Rampart House on the Porcupine River.

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The party, consisting of 18 men, sailed from Seattle on the steamer *Jefferson* on April 29. The 34 horses were taken on the same vessel. The party arrived at Skagway on May 4 and at White Horse on May 6.

To gain about three weeks over the usual opening of navigation through the lakes and the upper river the party left White Horse on foot on May 10 for Carmacks, 150 miles distant and well below the dangers of navigation, with such wagons as were necessary to transport the baggage and instruments. The chief of party and the Canadian surveyor left White Horse for Dawson the next day. A cache of 8 tons of grain and the saddles for the horses, which had been left at Coffee Creek at the close of the preceding season, were found to have been destroyed by a forest fire. Of the grain not more than 500 pounds were fit for use. At Dawson arrangements for transportation were completed and other details arranged.

The party arrived at Dawson May 22 and transferred to the steamer *St. Michael* the same afternoon, leaving that evening at 9 o'clock. At Circle City they met the steamer *Tanana* and the stock barge which was to take both the Canadian and the American party to Rampart House.

The launch *Midnight Sun* and the poling boat *Polaris* had already begun operations on the Old Crow. Depots of food and provisions had been established between Rampart House and the Old Crow, so that the parties could go through to the base camp on that stream without stopping to relay supplies.

On June 1 the first parties left for the field of operations, Messrs. Gilmore and Ryus leaving with their pack trains with instructions to make the Old Crow and thence to relay provisions as long as the Davidson Mountains remained impassable. On June 3 Messrs. Guerin and Reaburn started with the remainder of the stock and all the supplies which were to be taken from Rampart House during the season. On June 7 Mr. Craig dispatched two men with a pack train of dogs to Herschel Island, where they were to establish the heliotrope station, with which it was hoped that connection could be made some time during the summer.

A joint party headed by Mr. Riggs and Mr. Craig, the Canadian surveyor, was delayed at Rampart House until June 14. On June 19 they arrived at the Old Crow, remaining there one day to direct the movement of the launches and poling boats. Altogether, there were now about 60 tons of supplies inside the bar at the mouth of the Old Crow and at other points up the river.

The party crossed the Davidson Mountains and after a two days trip camped at the American cache on the north bank of the Firth River.

During the journey from the Porcupine River the monumenting and topography of the previous season were inspected and sites were selected for the interpolation of additional monuments where needed.

On June 30 the party moved to Joe Creek, a tributary of the Firth, there finding Mr. Lambart, the Canadian surveyor, in charge of the stadia and monumenting, and accompanied him along the line, selecting monument sites between Joe Creek and the next large unnamed tributary to the north. Camp was made 12 miles east of the line. The British Mountains were crossed about 7 miles east of the bound-

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ary. A party under Mr. Ryus made a dangerous crossing on the ice to Herschel Island, in the hope of obtaining medical assistance for Mr. Reaburn, who had been taken ill. The reconnoissance and line projection were afterwards continued by Mr. Riggs, in conjunction with the Canadian surveyor, Mr. Craig. In the meanwhile Mr. Gilmore was continuing the triangulation and occupied stations on the summit of the British Mountains. Mr. Guerin and Mr. Ryus were engaged in topographic work. On July 13 camp was moved to the Clarence River near station Z of the boundary, and on the 17th to a point 4 miles to the northward. On July 18 the party reached the shores of the Arctic Ocean.

After setting the boundary signal the reconnoissance and triangulation were continued. A signal was placed at Demarcation Point on a slight elevation near where a spit runs around Beaufort Bay.

On July 23 a reconnoissance and triangulation were begun to the eastward to connect with Herschel Island. After reaching the mouth of Malcomb River progress was interrupted by storms, and as the provisions were getting low the attempt to determine a point on Herschel Island was abandoned. On the return the stadia party was met at the boundary. One of the 5-foot aluminum bronze sectional monuments was in place. The topography was also completed to the coast. The topography of the ocean shore was extended eastward to Clarence Bay and westward to include Demarcation Point and Beaufort Bay. Some triangulation along the coast was done, but progress was retarded by unfavorable atmospheric conditions. While the party was at the shore camp observations were made with a staff gauge of the rise and fall of the tides. On the return journey, while at Joe Creek, the party met Mr. Copley Amory, jr., and one man who had come into the country to collect specimens for the Smithsonian Institution. Mr. Amory accompanied the party back as far as the Old Crow River. The parties arrived at Rampart House on August 16, at Skagway on October 7, and at Seattle on October 12. Here the party was disbanded.

Canadian parties.—The chief of party was Mr. J. D. Craig, D. L. S., who maintained general supervision of field work.

The line projection was carried on jointly with an American party, J. D. Craig observing for the Canadians and Thomas Riggs, jr., for the Americans. There were two Canadians and four Americans in the party.

Vista cutting, monumenting, and stadia work.—One party under Frederick Lambart, D. L. S., ran stadia and placed monuments from the point where the work had been dropped in 1911 to the Arctic Ocean. Another party under Douglas Nelles, D. L. S., connected the work south of the Porcupine. At the close of the season he inspected and numbered all of the monuments from the Porcupine to the Yukon and tied in those to the triangulation of which the positions were not sufficiently determined.

Geology.—Mr. A. G. Madden, of the United States Geological Survey, with his two assistants, J. M. Jessup, of the Smithsonian Institution, and J. S. Harrington, took advantage of the facilities offered by the boundary survey to conduct a geological reconnoissance north from the point where they had closed their work in 1911. South of the Porcupine River Dr. D. D. Cairnes, of the Geological Survey of

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Canada, conducted a geological reconnoissance along the boundary covering the ground between the Yukon and the Porcupine not gone over by him in 1911.

Both geological parties were furnished with photographs of the previous season's work of the boundary party and also with tracings of the topography as it was plotted in the field.

Character of country.—North from "X" of the boundary through the coast range of the British Mountains the hills are steep and rugged, absolutely devoid of all vegetation. The streams are swift and scattered over bars of gravel and sand. In a few spots sufficient willows may be found for camp purposes, but for all side camps either wood has to be packed or oil burned. There is sufficient natural grass to furnish subsistence for the horses if a moderate amount of oats is provided. In the main the traveling is excellent, as there are few swamps and these only of small extent. Station "Y" of the boundary is on a high rocky ridge at about an elevation of 5,200 feet. From "Y" the country gradually rolls off to the lower foothills, which extend to within 12 miles of the ocean. From these foothills to the Arctic Ocean, a distance of about 12 miles, is the flat coastal plain dotted with a few lakes and permanent ice fields. A peculiarity of this plain is that it has a foundation of ice over which the rivers have carried deposits of gravel and sand. In places there has been a subsidence, caused by the melting of the ice and huge ice mushrooms appear, the tops of which carry about 3 feet of moss and dirt. Fine examples of the alluvial fan are shown where the rivers break through the foothills onto the tundra. The shore of the ocean consists of mud banks which drop, on an average, about 15 feet to a narrow pebble beach not more than 50 feet wide. The action of the ice seems to be gradually driving the beach line farther south. A peculiarity of the coast are the long sandy spits extending into the ocean, such as Demarcation Point and Icy Reef. At the highest point these spits can not be more than 10 feet above mean sea level. Plenty of wood for camp purposes is to be found scattered along the beach.

Inland waters.—North of the Old Crow River there are no navigable waters. The first river to be crossed on the journey north is the Firth, which runs through the valley in numerous channels, except where it narrows into what is known as the Canyon, well to the east of the line. The Canyon is always blocked with ice, and large portions of the valley have a perpetual covering of ice of about 8 feet in thickness. This river can not be crossed after heavy rains, as the rise is very sudden. The next rivers to be encountered are the Backhouse and the Malcolm Rivers, which are the same in character but much smaller. The Clarence River flows into Clarence Bay.

Horses.—Seventy-seven horses were shipped to Coffee Creek at the close of the field season of 1911 and from there driven to the head of White River for wintering. Of these only 21 survived. Thirty-four additional horses were purchased and three had been left at Rampart House during the winter. At the end of the season of 1912 thirty-four horses were sent to Champagne Landing to be kept during the winter and the rest were either sold or shot. Never during the years when the boundary survey was in progress have the horses come out in such good condition.

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Dogs.—Of the 10 dogs which were left at Rampart House 1 was shot and 1 given away, on account of a troublesome disposition. The others were sold.

Line projection.—The line was produced from " Y " of the boundary to the Arctic Ocean, a distance of 25.6 miles, by the method employed in previous years.

The party was the same as found under the heading " Canadian parties," with the party as reorganized. Thomas Riggs, jr., represented the United States commissioner. J. D. Craig represented the British commissioner.

The final point was set on the shore of the Arctic Ocean on July 18. The reconnoissance was begun by Mr. Reaburn and continued by Mr. Riggs in conjunction with the line projection. Signals were also erected by Mr. Craig and Mr. Guerin. Reconnoissance was carried eastward for two quadrilaterals, but all stations were not occupied, as one observer was not available, and it was on this account that it became impossible to make connection with Herschel Island. In all, 18 signals were erected on main-scheme stations.

Triangulation.—Triangulation was conducted in accordance with the rules for tertiary triangulation of the Coast and Geodetic Survey, with additional instructions to fit local conditions.

The instruments used were the 6½-inch and 7-inch Berger repeating theodolites on the main-scheme stations and at main-line points. The monument sites were tied into the main scheme with 4-inch and 6½-inch theodolites.

The first stations occupied were Tub and Reaburn, using the line Siwash-Turner as the going forward line.

Mr. Wm. B. Gilmore was in charge of triangulation on the main scheme, additional triangulation being done by Thomas Riggs, jr., J. D. Craig, Frederick Lambart, and Douglas Nelles.

Magnetic observations.—In addition to the work of triangulation Mr. Gilmore occupied six stations with the Coast and Geodetic Survey compass declinometer No. 744 for magnetic declination. The results have been transmitted to the commissioner. In all, six new stations were occupied.

Mr. Guerin and Mr. Ryus obtained a very close declination at Demarcation station and various points adjacent by scaling with a protractor from their plane-table sheets the true azimuth from the magnetic bearing.

Topography.—Owing to the small amount of topography to be done only one topographic party was put in the field. This consisted of the chiefs of last year's two parties with one assistant topographer. The party picked up the work where it had been abandoned in 1911 and carried it to completion on the shores of the Arctic, then extending east and west so as to take in natural objects to which the boundary could be referred. After the coast was reached Mr. Guerin and Mr. Ryus separated, Mr. Guerin working west while Mr. Ryus with only three men worked to the east.

On the coast 20-foot contours were put in so as to show such small eminences as would otherwise be lost in the 100-foot contours.

The method employed was the same as in previous seasons. Horizontal and vertical control furnished by field computations of triangulation and supplemented by plane-table triangulation from in-

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tersections with elevations computed from vertical angles. Rivers and streams and coast lines were traversed by stadia.

The instruments used were the Johnson head-plane table with 18 by 24 board and Bausch & Lomb special alidades. The field scale is 1/45,000; contour interval 100 feet, except as stated above; datum mean sea level carried from the coast and adjusted through two sheets, whence a correction is added to the elevations along the remainder of the boundary line.

In June preparations were made for a joint inspection of the boundary by the American and the Canadian surveyor. The party left Seattle on June 9, but owing to various delays work was not begun until June 27.

[ASA C. BALDWIN.]

SUMMARY OF RESULTS.—Reconnoissance: Length of scheme 90 statute miles, 38 points selected for main scheme, and 7 for secondary scheme. Base lines: 2 (one 2,552.2697 meters in length). Triangulation: Length of scheme 90 miles, 38 signals erected in main scheme and 7 in secondary scheme, 44 stations occupied for horizontal measures, 38 stations occupied for vertical measures. These statistics include work done in the spring of 1912.

After the initial points on the one hundred and forty-first meridian on the south bank of the Yukon River had been determined in 1907, the projection and survey of this dividing line between Alaska and Canada were carried southward until a high range of mountains beyond the White River was reached. Mount Natazhat of this range, 13,435 feet in height, was found to stand nearly on the line, and presented so formidable a barrier that it was impracticable to pass over it. The following year, therefore, operations were begun north of the Yukon River and continued toward the Arctic Ocean. The section south of Mount Natazhat was left unsurveyed and the demarcation of the boundary line in this direction temporarily suspended.

This unsurveyed line south of Mount Natazhat was known to extend about 80 miles and to end near Mount St. Elias, but very little was known of the intervening region. In 1909 Mr. Riggs had carried the triangulation up the White River and about 30 miles west of the line. It was now proposed to extend this work and to establish and mark the boundary between Mount Natazhat and Mount St. Elias.

The plan of work adopted involved carrying the triangulation to the west of Mount Natazhat until a passable route should be found leading to the boundary south of the mountain range; to establish some one point on the boundary there; or, if that should be impracticable in one season, to determine whether or not the region is accessible and whether it would be possible to trace the meridian on the surface at some future time.

The chief of party left Washington on February 23 for Seattle, where a party was organized. Leaving Seattle on March 19 the party arrived at Cordova, Alaska, on March 23 and at McCarthy station, the nearest point on the railroad to the locality of field work, on the 25th.

McCarthy station is over 60 miles from the boundary on the White River and to connect with the previous survey work there the Skolai Pass had to be crossed. It is a 5,000-foot divide filled with a glacier

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and is the one pass from the Nizina drainage to the White River. Horses and sleds were used for transporting supplies, and by April 5 the entire outfit had been moved across the Nizina River and a main cache had been established at the mouth of Chititu Creek. From the information now available it was concluded that the one practicable route for carrying forward the work was the drainage route. The plan adopted was, after joining the work on the White River, to extend it over Skolai Pass and follow the Skolai Creek and the Nizina River as far as Chititu Creek and then to cross the low foothills to the Chitina River where a turn could be made toward the one hundred and forty-first meridian.

From the amount of snow on the ground it was evident that some time would be required to break a trail to the pass, and it was decided to utilize this time by building the triangulation stations up the Nizina as the party proceeded. Initial positions were taken from the United States geological map of the Nizina district, plotted on the plane-table sheet and used for orientation.

On April 7 the ascent was made of East Sourdough Peak (6,670 feet) and later a cairn signal was built. During the following week signals Young Creek, May Creek, Geological, and Boulder were built. In addition a base site was selected on the Nizina River and its ends marked with concrete piers.

Two men were sent up the Nizina to build signals while the chief of party was measuring the azimuth of the base and observing for latitude, time, and azimuth.

A party sent to break a trail across Skolai Pass returned on May 1, having accomplished their object with much difficulty. The foot of the Nizina glacier had not been reached, but a cache had been built at timber line 15 miles from the glacier. One of the horses had been killed by falling over a bluff.

In this locality it was necessary to build an additional signal before turning at right angles toward Skolai Creek. This signal was placed on what is called Goat Island, which rises 8,500 feet above a sea of glaciers.

Up to this time 12 signals had been built, which formed a scheme of triangulation spanning the Nizina River from Chititu Creek to Skolai Creek. It was now decided to recover the old stations on the White River as soon as possible. Leaving the valley of the Nizina the party followed the trail which had been broken to Skolai Creek. Skolai Pass was crossed on May 23 and on the 24th the White River was reached.

At White River stations Bend, End, Solo, and Skolai were recovered and a reconnoissance was begun to connect with the stations on the Nizina River.

On June 6 and 7 the consequences of the eruption of Mount Katmai volcano were noticed by the frequent falling of large masses of ice from the mountain peaks accompanied by a rumbling sound resembling thunder.

Observations were finished and the pass recrossed on June 12.

On Skolai Creek additional signals were built so as to form a continuous scheme of triangulation from White River to Chititu Creek. The occupation of these stations was finished by July 10, by which date 50 miles of reconnoissance and 30 miles of triangulation had

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been completed. To reach the boundary at the head of the Chitina River would have required about 100 miles of triangulation, an amount too great to be accomplished in the time remaining available for work. It was imperative, however, that the Chitina should be reached, in order to control the work of the topographic party and to gain the required information concerning the country along the one hundred and forty-first meridian.

Camp was therefore moved to Chititu Creek, the reconnoissance taken up where it had been begun in the spring, and the work of signal building in the direction of the Chitina advanced as rapidly as possible. On the 24th the valley of this river was reached and a turn made in the scheme toward the one hundred and forty-first meridian. The reconnoissance was continued 20 miles farther to include the initial signals of the topographical party and command the mountains up the valley in the vicinity of the boundary.

After the completion of the reconnoissance the remainder of the season was devoted to observing angles. Sixty miles of triangulation remained to be done after August 1. An observer was detailed from the topographic party to aid in the triangulation, and by September 1 all but 10 miles of the work was finished.

The combined parties then met at the Nizina River base line and measured it on September 10.

After another week devoted to observing angles the party returned to McCarthy station, and thence via Cordova to Seattle, where the hands were discharged on October 10.

In May, 1913, a base line was measured and arrangements were made to extend the triangulation up the Logan Glacier. By June 1 the reconnoissance was completed to a point within 8 miles of the boundary, when progress was delayed by a heavy snowfall.

[D. W. EATON.]

SUMMARY OF RESULTS.—Topography: 500 square miles of area covered by plane table, 200 square miles covered by phototopographic method.

The topographic survey of the international boundary line and region adjacent in the vicinity of the Chitina River and along the one hundred and forty-first meridian between Mount St. Elias and Mount Natazhat, Alaska, was in progress at the beginning of the fiscal year. This work was based upon triangulation done by a separate party working in cooperation with the topographic party. The region to be surveyed being comparatively unknown much of the season's work was necessarily of an exploratory nature.

Transportation of the party and supplies was by rail from Cordova to Chitina and thence by horses and sleds to within about 12 miles of the Chitina Glacier.

Signals were erected and a small scheme of triangulation was carried up from the surveyed topography at Canyon Creek to the Chitina Glacier. To begin the plane-table work a traverse line was run up the valley of the Chitina for a distance of 12 miles to a connection with the triangulation scheme. From this point a plane-table triangulation was continued to the boundary and up the Anderson Glacier.

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The topography was carried up the Chitina Valley to and along the one hundred and forty-first meridian northward toward Mount Natazhat as far up the Anderson Glacier as practicable. The photo-topography covers the same area as the plane-table work, the valley being covered by both methods.

In the latter part of the season the topographic party cooperated with the triangulation party in measuring a base line and completing the triangulation.

The Chitina River ("Chitni"=copper and "na"=river) valley was at one time occupied by a great valley glacier, the traces of which are shown by lateral moraines far up on the mountain sides. The glaciers at the head of the Chitina Valley are the remnants of this once great glacier, and they have their sources in the elevated region between Mount Natazhat on the north side and Mount Logan and Mount St. Elias on the south. Across this elevated region runs the boundary line along the one hundred and forty-first meridian to a point near and to the northwestward of Mount St. Elias. The region to the westward of Mount Logan appears to be the source of numerous glaciers extending to the northward and joining the Logan Glacier.

PORTLAND CANAL.

[FREMONT MORSE.]

On July 19, in accordance with instructions, Mr. Fremont Morse joined Mr. Clinton Dennis on Portland Canal, as representative of the American commissioner in placing or identifying reference marks or monuments for the turning points of the boundary line. The Canadian party had been in the field since the latter part of May, and had erected monuments opposite the turning points of the line down the canal from No. 20 to No. 15.

The main triangulation was extended during the season through a chain of nine quadrilaterals from the base Twel-Thur to the line Thirty-Thirty-one, a distance of about 64 miles. The last two stations were not occupied.

Photographs were taken at all the main stations and at some subsidiary topographic stations from which the topography of region adjacent to the canal can be plotted.

Monuments were erected opposite the following turning points of the boundary line, viz: Nos. 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, and 5. There are two monuments for each turning point except that on the Alaska side of the canal near Camp Point, one monument, called U. S. 16 and 17, was used to mark both the 16 and 17 turning points.

A change was found necessary in the form of the reference monuments and the method of setting them, in order to prevent damage from winter high tides and storms. The height of the monuments was decreased to 18 inches and the area of the base considerably increased. Three iron rods, instead of one, were embedded in each of the monuments with a view to increasing their stability. Work was closed for the season on October 12. Work in the field was resumed on May 23, and was in progress at the close of the fiscal year.

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DETAILS OF OFFICE OPERATIONS.

The Assistant in Charge of the Coast and Geodetic Survey office has direct supervision of the work of the office. The Miscellaneous Section and the Tidal Research Section are under his immediate direction.

COMPUTING DIVISION.

The greater part of the time of this division was given to the reduction of field operations and the preparation of results for publication and the preparation of data for field parties of the Survey and for departments of the Government, civil engineers, and others interested in the work.

The computation and reduction of the triangulation along the coasts and in the interior of the United States and along the international boundaries has made satisfactory progress. Much work was done on the computation and adjustment of the precise level net in the United States and the preparation of results for the printer.

The use of the photostat for copying, formerly done on the typewriter, has increased the output of the division and effected a great saving in time and labor. The division has thus been enabled to furnish information more promptly and to change the system of book registers for a vertical filing system.

Five publications relating to geodetic work were received from the printer during the year and the text of another was submitted for publication. Proof of a number of publications was read in the division and progress made in the preparation of others which were nearly completed by the close of the fiscal year.

The computations made at the office by many of the field officers of the Survey and of officers engaged on the international boundary work were supervised in the Computing Division. Several computers employed on the boundary work were attached to the division. A number of field officers have aided in the work of the division when not employed in the reduction of their own field observations.

DIVISION OF TERRESTRIAL MAGNETISM.

Besides supervising the work of the computers engaged in the reduction of the magnetic results and the preparation of these results for publication, the chief of this division represented the Department of Commerce at the first meeting of the National Association of Port Authorities, which met at New York City on December 9, 1912.

The statistics of correspondence during the year show a steady demand for information concerning terrestrial magnetism and particularly the magnetic declination.

The revision of field observations on land and sea was kept up to date, including the compass declinometer work on the one hundred and forty-first meridian boundary in Alaska.

The results of field magnetic observations on land and at sea for the period from July 1, 1911, to December 31, 1912, were prepared and submitted for publication as Special Publication No. 15.

Four publications relating to the work of the magnetic observatories were prepared and submitted for publication during the year,

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the proof of four publications was read, and progress was made in the preparation of one other publication.

Magnetic and seismological data were furnished for the use of the International Commission of Terrestrial Magnetism, the International Seismological Association, the Seismological Committee of the British Association, the Kew Observatory, and the Department of Terrestrial Magnetism of the Carnegie Institution of Washington.

Investigations were made of the scale values and constants of magnetic instruments.

Several papers containing results of magnetic observations were prepared for publication in the Journal of Terrestrial Magnetism.

TIDAL DIVISION.

During the year the Tide Tables for 1914 were completed and published, harmonic analyses were completed for 4 stations, each one year in length, and some of the summations were made for analysis of one other station for one year. Nonharmonic reductions were made for 145 stations, with a combined length of 60 years, 2 months, and 11 days; mean sea level was computed for 38 stations, with a combined length of 68 years, 9 months, and 20 days; high and low waters and hourly heights of the sea were tabulated for 251 stations, with a combined length of 61 years; 264 volumes of soundings were reduced, involving the computation of the plane of reference for 233 stations and the entering of many thousand tide reducers.

There were received, examined, registered, and indexed tidal records for 48 stations in the eastern division, 4 stations in the middle division, 9 stations in the western division, 25 stations in the Alaska division, and 18 stations from the Philippine Islands and Hawaii.

Additional observations of tides have been received from the Corps of Engineers, United States Army, the Ordnance Department, United States Army, the Hawaiian government survey, the Hydrographic Office of the Navy Department, the Government of Cuba, and from Tientsin, China.

Tidal data were exchanged with the Imperial Hydrographic Office at Wilhelmshaven, Germany, and copies of tidal predictions for Wellington and Auckland were furnished to the secretary of the Marine Department at Wellington, New Zealand.

CHART CONSTRUCTION DIVISION.

On account of the character of the work of this division ample well-diffused daylight is an essential in order to properly deal with the fine details of the charts. The present quarters are inadequate for the growing demands on this department of the work, not only in the respect mentioned but also as regards heat, ventilation, and proper supervision. An increase in the personnel and equipment will also be necessary to meet the necessity for an increased output of charts. The demand during the year 1913 was more than 9 per cent greater than for the previous fiscal year.

In the drawing section the present practice of making chart drawings on vellum has been found subject to certain disadvantages, to

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avoid which it is proposed to return to paper as the best medium for the drawing and it is expected that by using celluloid transfers the compilation can be copied almost as rapidly as in the case of vellum.

Besides the new charts constructed good progress was made in replacing the old diagonal and double unit charts with those of the new scheme.

The work of the engraving section with a slight exception is more nearly up to date than ever before.

The facilities of the printing section have been taxed by the increased demand for charts as well as by a delay caused by the necessity of installing a new electric-power cable. The surface printing from aluminum plates of an increased number of charts, including some of the old engraved charts for which there is a large demand, is expected to relieve the situation to some extent. The surface printing of charts from aluminum plates, among other desirable features, enables corrections to be made with great facility in the aids to navigation shown on the charts. Additional presses are needed in the lithographic section.

The electrotype section, owing to the extensive corrections to plates, has become overcrowded with work, and the purchase of two additional vats is recommended.

The photograph section, besides the usual work, has turned out a large amount of copying with the photostat for the different divisions of the office, taking up a large part of the time of one of the photographers. Additional help is needed in this section.

The statistics of work during the year are as follows:

CHART PREPARATION.

Schemes approved for new charts	15
Approved schemes on hand, charts not started	5
Drawings for new charts finished	15
Drawings for new charts in hand	13
New drawings for new editions finished	5
New drawings for new editions in hand	2
Extensive corrections finished	121
Extensive corrections in hand	5
Chart drawings from Manila for new charts finished	12
Chart drawings from Manila for new editions finished	1

Various miscellaneous drawings and tracings.

ENGRAVING.

New plates for new charts finished	9
New plates for new charts in hand	10
New engraved plates for former lithograph charts finished	4
New etched plates for former lithograph charts finished	3
New bassos for new editions finished	15
New bassos for new editions in hand	14
New bassos for reissues finished	7
New bassos for reissues in hand	20
New editions using current plate finished	21
New editions using current plate in hand	2
Extensive corrections applied to plates	258
Extensive corrections in hand	13
Miscellaneous plates engraved or corrected	8
Minor corrections applied to plates	1,315
Charts in engraving section, engraving not started	2

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PRINTING.

New subjects printed from aluminum plates	116
Reprints printed from aluminum plates	77
Reprints printed from stones	3
Total number of different lithograph charts printed	196
Different engraved charts printed	803
Miscellaneous lithographic publications	19
Miscellaneous engraved publications	2
Copies of lithograph charts printed and delivered	61,939
Copies of engraved charts printed and delivered	79,595
Miscellaneous lithographic prints	61,875
Miscellaneous engraved prints	37
Total	203,446
Lithographic impressions (all work)	244,578
Engraved impressions (all work)	88,187
Total	332,765

ELECTROTYPING.

Altos completed	56
Bassos completed	56
Total	112

PHOTOGRAPHING.

Glass negatives made	992
Paper negatives made	32
Velox prints made	1,215
Vandyke prints made	135
Bromide prints made	340
Blue prints made	2,123
Photostat prints made	11,240
Lantern slides made	1
Matrices made	74
Prints mounted	23
Negatives developed	6
Photolithographic negatives, number of charts	76

CHART DIVISION.

The regular work of this division has been continued during the year, and by details of employees from other divisions from time to time it has been possible to keep up with the increasing demand for charts.

There are now 149 sales agencies for Charts, Coast Pilots, and Tide Tables, not including the subagencies of the office at Manila.

The total issue of charts for the year was 143,694, an increase of 12,357 over the previous year. The issue of Coast Pilots was 5,555 copies, and of Tide Tables, Atlantic coast, 1,729; Pacific coast, 10,380: complete, 936.

In addition to the Charts, Coast Pilots, and Tide Tables, the following publications were received during the year for sale:

Catalogue of Charts, Coast Pilots, and Tide Tables, 1912; Notes on Inland Waterways; Supplements to Coast Pilots, as follows: Parts I, II, III, IV, V, VIII, California, Oregon, and Washington; and Alaska, Part I.

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There were issued of the Chart Catalogues 1,695 copies, of the Maryland Oyster Charts 6,954 copies, and of the United States and Canada Boundary maps, 1906, one set.

There were delivered to the division 34 new charts and 75 new editions of charts, and 26 charts and 5 plans were canceled.

Charts were issued as follows:

Sales agents	55,257	Suboffice, Manila, P. I.	6,282
Sales by Office and Chart Division	2,760	Executive departments	6,212
Congressional account	5,512	Foreign governments	1,290
Hydrographic Office	52,955	Miscellaneous	1,887
Bureau of Lighthouses	4,823	Total	143,694
Coast and Geodetic Survey Office	6,716		

The following Coast Pilots were distributed and sold during the year:

Part I–II	343	Inside Route Pilot	1,753
Part III	459	Porto Rico	47
Part IV	571	California, Oregon, and Washington	510
Part V	451	Alaska	577
Part VI	466		
Part VII	105		
Part VIII	273	Total	5,555

The following Tide Tables were distributed and sold during the year:

Atlantic coast:		Pacific coast:		Complete:	
1867	1	1867	1	1896	1
1885–1894	10	1886–1895	10	1897	1
1895	2	1901–1903	3	1898	2
1901	2	1907	1	1899	2
1902	2	1909	1	1900	1
1903	2	1910	1	1902	1
1904–1906	3	1911	1	1903	1
1907	2	1912	475	1908	2
1908	1	1913	9,887	1909	1
1909	2			1910	2
1910	4			1911	3
1911	4			1912	78
1912	217			1913	840
1913	1,477			1914	1
Total	1,729	Total	10,380	Total	936

Charts were issued at the suboffice, Manila, P. I., as follows:

Sales agents	1,081	Executive departments, Philippine Islands	802
Sales at suboffice	1,855	Miscellaneous	107
Army	469	Total	5,329
Hydrographic Office (Navy)	482		
Coast and Geodetic Survey	250		
Suboffice, Manila, and vessels of the Survey	283		

INSTRUMENT DIVISION.

The report of the Chief of the Instrument Division contains the usual detailed statistics of the work of the employees during the year. The work of repairing instruments used in the Survey, and of design-

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ing and constructing special new instruments and apparatus, including, incidentally, experimental researches, adaptations and improvements to meet new requirements, was satisfactorily performed.

The selection and purchase of new instruments and material when required was also attended to by this division. The making and repairing of furniture and repairs to office buildings; packing and unpacking instruments and general property issued from and received at the Coast and Geodetic Survey Office; and special technical woodworking, have been given careful attention.

The duty of accounting for all instruments and general property, including furniture, and of preparing the correspondence incidental thereto, was continued as heretofore.

The work of finishing the new tide-predicting machine No. 2 was completed. Various scientific instruments were tested for foreign governments. The tide gauges and indicators in New York City and at Fort Hamilton, N. Y., were inspected and repaired during the year.

LIBRARY AND ARCHIVES.

The report of the Chief of Division of Library and Archives gives the usual details concerning the collection of books, periodicals, maps, and charts, and the receipt of original topographic and hydrographic sheets, photographs, and field records of every kind.

Ten thousand books and pamphlets of no further use to the Survey were taken from the shelves and listed for transfer to the Library of Congress or bureaus of this Department. Three thousand books and pamphlets selected from some 7,000 items no longer needed were transferred to the Library of Congress. Seven thousand books and pamphlets of no further use to the Survey and not desired by other bureaus are recommended for condemnation and sale.

A compilation of Coast and Geodetic Survey work in the Philippine Islands was prepared.

The number of field records received during the year was 25 per cent greater than that for any previous year. No less than 272 original hydrographic and topographic sheets were received and registered.

The revision of the map catalogue and the elimination of useless maps was continued.

ACCESSIONS.

Classification.	Purchased.	Donated.	Exchanged.	Total.
Books and pamphlets	85	.....	568	653
Maps, charts, and blue prints	.....	.....	1,528	1,528

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STATISTICS OF ACCESSIONS—ARCHIVES ACCESSIONS.

Subjects.	Volumes.	Cahiers.	Sheets.	Miscellaneous.
Astronomy:				
Observations, original	9	13		14
Computations—				
Field		11		
Office		2		
Geodesy:				
Observations, original	150	21		
Computations—				
Field	1	83		
Office		31		
Hypsometry:				
Observations, original	80	41		
Computations—				
Field		7		
Office		4		
Magnetics: Observations, original		270		
Soundings	549			
Sheets:				
Hydrographic			139	
Topographic			133	
Boundary reports		4		
Tides:				
Original observations	138	4		
Marigrams				165
Meteorology	2			
Currents	3			
Levels	2			
Topographic miscellany	17	4		2
Hydrographic miscellany	5	1		
Photographic material (negatives and prints)				220
Total	965	496	272	401

TIDAL RESEARCH SECTION.

Current observations taken during the summer season on board certain light vessels in the fifth and sixth lighthouse districts of the direction and velocity of the wind were tabulated and reduced.

Short series of current observations made in connection with the work of field parties were plotted and reduced.

Current predictions for Seymour Narrows, British Columbia, and Sergius Narrows, Alaska, were furnished for use in the Tide Tables for 1914, and rules were deduced by which it can be ascertained when the currents in these passages will be least violent.

Some work was done upon the compilation of tidal and related matter from published French and German sources.

Tides observed at Gauss station, Antarctic continent, by Prof. Dr. Erich von Drygalski in 1902 have been plotted and are being reduced, and tidal data obtained at other stations in the southern hemisphere are being compiled and examined.

Temperature observations of air and water between Cape Flattery and the Hawaiian Islands made by the Coast and Geodetic Survey steamer *Patterson* in 1912 and 1913 were tabulated and plotted.

Brief consideration was given to questions connected with cotidal lines and also to matters relating to sea-level determination.

Information has been furnished in reply to requests from outside parties on a wide range of scientific subjects often requiring considerable study and investigation.

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MISCELLANEOUS SECTION.

This section attends to the purchase and distribution of supplies and keeping of the accounts relating thereto; makes requisitions for printing and binding; issues stationery to field parties and office divisions; audits accounts payable from the appropriation for "Office expenses;" conducts the correspondence relating thereto; and performs various other miscellaneous duties.

A contract for rewiring the Coast and Geodetic Survey buildings under an appropriation made by Congress was awarded on May 21, and this necessary work was in progress at the close of the fiscal year.

On January 1, 1913, the chief of this section was appointed by the Secretary of Commerce to serve as a member of the General Supply Committee, and since then about half of his time has been spent on duties in connection with that work.

Respectfully submitted.

O. H. TITTMANN,
Superintendent.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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REPORT

OF THE

SUPERVISING INSPECTOR GENERAL, STEAMBOAT INSPECTION SERVICE

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REPORT

OF THE

SUPERVISING INSPECTOR GENERAL

STEAMBOAT-INSPECTION SERVICE.

DEPARTMENT OF COMMERCE,
STEAMBOAT-INSPECTION SERVICE,
Washington, September 2, 1913.

SIR: Herewith is submitted the report of the operations of the Steamboat-Inspection Service for the fiscal year ended June 30, 1913, as required by section 4403, Revised Statutes, and Department regulations relating thereto.

PERSONNEL.

The total number of persons in the Service at the end of the fiscal year was 260, consisting of 185 officers, 74 clerks, and 1 messenger, as follows: At Washington, the Supervising Inspector General, a chief clerk (who is Acting Supervising Inspector General in the absence of that officer), 6 clerks, and 1 messenger; in the Service at large, 10 supervising inspectors, 46 local inspectors of hulls, 45 local inspectors of boilers, 40 assistant inspectors of hulls, 42 assistant inspectors of boilers, and 68 clerks to local inspectors.

During the year 3 local inspectors of hulls, 1 local inspector of boilers, 1 assistant inspector of boilers, and 7 clerks were appointed from without the Service; 2 local inspectors of hulls, 1 local inspector of boilers, and 7 clerks resigned; 1 supervising inspector and 1 local inspector of boilers died; 1 clerk was transferred and appointed to the Service from an office outside of the Service; 1 assistant inspector of hulls was dismissed; 2 local inspectors of hulls, 3 local inspectors of boilers, 1 assistant inspector of boilers, and 7 clerks of the Service were transferred to other offices within the Service, of whom 9 received increases in salary by promotion. One temporary appointment as clerk to the local inspectors at New York, N. Y., expired at close of June 30, 1913. Three vacancies in permanent positions existed in the Service on June 30, 1913. There were 262 permanent positions in the Service at close of June 30, 1913.

SUMMARY OF OFFICE WORK.

Following is a summary of the work of the Office of the Supervising Inspector General for the fiscal year ended June 30, 1913:

Copies of circular letters issued	101,607
Excursion permits reported issued	442
Permits to use oil as fuel on steamers	96

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Miscellaneous accounts examined and approved	730
Index (card system) correspondence, new numbers	6,960
Estimated number of letters answered	22,000
Personal-expense accounts examined and approved	1,960
Daily reports of inspectors examined and approved	18,154
Reports of casualties and violations of the law recorded and filed	2,106
Statements of public property charged to Service received, examined, and filed	116
Reports of tests of material at mills and affidavits of boiler makers received, recorded, and filed	1,169
Reports examined of life preservers inspected at factory	430
License cards received, examined, and filed	35,000
Vessel inspection cards received, examined, and filed	12,000
Reports of absences received, examined, and filed	588
Reports of circular letters acknowledged received, examined and filed	696

A comparison of the above summary with that for the fiscal year ended June 30, 1912, shows an increase in nearly all the principal lines of work.

EXPENDITURES.

Following is a detailed account of the expenditures for the fiscal year ended June 30, 1913:

Salaries, Supervising Inspector General, supervising and local inspectors, assistant inspectors, and clerks to local boards, authorized by acts of Congress approved April 4, 1888, March 3, 1905, April 9, 1906, and May 28, 1908 (appointments authorized by sections 4402, 4404, and 4414, Revised Statutes)	$431,130.50
Salaries, clerks and messenger in the office of the Supervising Inspector General, at Washington, D. C.	10,570.55
Total	441,701.05
Traveling expenses (actual and mileage)	63,901.75
Rents, offices	10,209.36
Stationery, supplies, and transportation of same	2,074.26
Telephone rents, telegrams, and postage	1,896.70
Furniture and repairs to same	1,204.87
Witnesses' fees and mileage in cases of investigation	603.75
Notary fees to certificates of inspection and expense accounts	590.20
Janitor service	400.81
Typewriting machines, repairs, and supplies	380.31
Instruments and repairs to instruments	342.35
Marine publications and official railway guides	275.00
Ice, fuel, and electric light	250.09
Toilet service, laundry, soap, etc	104.00
Post-office box rent	21.55
Street-car tickets (for use of messenger in Washington)	17.00
Moving offices and machinery	10.00
Miscellaneous	15.15
Total traveling and miscellaneous expenses	82,297.15
Salaries as noted above	441,701.05
Total expenditures for year ended June 30, 1913	523,998.20
Total expenditures for year ended June 30, 1912	518,964.79
Increase, 1913	5,033.41
Salaries, 1913	441,701.05
Salaries, 1912	441,243.44
Increase, 1913	457.61

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Contingent expenses, 1913	$82,297.15
Contingent expenses, 1912	77,721.35
Increase, 1913	4,575.80
Rents, 1913	10,209.36
Rents, 1912	10,991.00
Decrease, 1913	781.64
Traveling expenses, actual and mileage, 1913	63,901.75
Traveling expenses, actual and mileage, 1912	59,595.34
Increase, 1913	4,306.41

As shown above, there was a small increase in salaries and a small increase in contingent expenses during the fiscal year 1913, as compared with the preceding fiscal year, the increase in contingent expenses being due to an increased amount of travel.

NUMBER, CLASS, AND TONNAGE OF VESSELS INSPECTED.

There is submitted herewith a tabulated statement showing the number, class, and tonnage of vessels regularly inspected by this Service and granted certificates.

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CERTIFICATES OF INSPECTION ISSUED TO STEAM, SAIL, AND MOTOR VESSELS AND TO BARGES DURING THE FISCAL YEAR ENDED JUNE 30, 1913, BY DISTRICTS.

Supervising district.	Local district.	Domestic vessels.										Foreign passenger steam vessels.		Total.	
		Steam vessels.		Motor vessels.		Passenger sail vessels.		Passenger barges.		Seagoing barges.		Total.					
		No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
First	San Francisco, Cal.	392	514,690	54	5,096	2	2,000	.....	.....	5	10,077	453	531,863	8	32,501	461	564,364
	Honolulu, Hawaii	25	11,608	4	170	.....	.....	.....	.....	1	913	30	12,691	7	74,597	37	87,288
	Juneau, Alaska	56	3,590	2	116	.....	.....	.....	.....	1	107	59	3,813	.....	.....	59	3,813
	Portland, Oreg.	138	30,024	18	1,090	.....	.....	.....	.....	.....	.....	156	31,114	.....	.....	156	31,114
	St. Michael, Alaska	38	13,782	4	93	.....	.....	.....	.....	.....	.....	42	13,875	.....	.....	42	13,875
	Seattle, Wash.	267	127,197	27	2,246	.....	.....	3	2,003	13	17,358	310	148,804	38	235,012	348	383,816
Second	New York, N. Y.	1,224	843,396	49	2,401	.....	.....	12	4,560	153	134,680	1,438	985,037	214	2,144,852	1,652	3,129,889
	Albany, N. Y.	163	53,189	.....	.....	.....	.....	2	523	.....	.....	165	53,712	.....	.....	165	53,712
	New Haven, Conn.	80	10,578	43	1,372	.....	.....	.....	.....	.....	.....	123	11,950	.....	.....	123	11,950
	Philadelphia, Pa.	297	158,576	12	522	.....	.....	.....	.....	86	75,694	395	234,792	24	185,337	419	420,129
Third	Norfolk, Va.	200	109,770	26	678	.....	.....	2	620	82	63,257	310	174,325	1	3,546	311	177,871
	Baltimore, Md.	256	154,308	38	2,271	.....	.....	.....	.....	22	21,293	316	177,872	11	90,697	327	268,569
	Charleston, S. C.	67	6,623	16	490	.....	.....	.....	.....	4	720	87	7,833	.....	.....	87	7,833
	Jacksonville, Fla.	50	8,612	18	678	.....	.....	.....	.....	7	5,037	75	14,327	1	73	76	14,400
	Savannah, Ga.	56	38,558	4	302	.....	.....	.....	.....	.....	.....	60	38,860	.....	.....	60	38,860
Fourth	St. Louis, Mo.	90	14,931	14	332	.....	.....	.....	.....	.....	.....	104	15,263	.....	.....	104	15,263
	Dubuque, Iowa	59	6,699	29	1,310	.....	.....	3	(57	.....	.....	91	8,666	2	793	93	9,459
Fifth	Boston, Mass.	209	122,943	8	242	.....	.....	.....	.....	50	54,651	267	177,836	29	278,282	296	456,118
	Bangor, Me.	58	9,790	4	521	.....	.....	.....	.....	6	5,393	68	15,704	2	490	70	16,194
	New London, Conn.	70	20,543	19	595	.....	.....	.....	.....	6	4,472	95	25,610	.....	.....	95	25,610
	Portland, Me.	63	19,038	5	138	.....	.....	.....	.....	14	7,287	82	26,463	13	118,556	95	145,019
	Providence, R. I.	143	87,531	7	182	.....	.....	.....	.....	41	49,001	191	136,714	1	1,352	192	138,066
Sixth	Louisville, Ky.	48	8,646	6	276	.....	.....	.....	.....	.....	.....	54	8,922	.....	.....	54	8,922
	Evansville, Ind.	49	7,769	2	135	.....	.....	.....	.....	.....	.....	51	7,904	.....	.....	51	7,904
	Memphis, Tenn.	66	10,426	6	138	.....	.....	.....	.....	.....	.....	72	10,564	.....	.....	72	10,564
	Nashville, Tenn.	78	9,208	.....	.....	.....	.....	.....	.....	.....	.....	78	9,208	.....	.....	78	9,208
Seventh	Pittsburgh, Pa.	107	18,369	.....	.....	.....	.....	.....	.....	.....	.....	107	18,369	.....	.....	107	18,369
	Cincinnati, Ohio	47	10,450	.....	.....	.....	.....	1	575	.....	.....	48	11,025	.....	.....	48	11,025
	Point Pleasant, W. Va.	48	5,533	3	66	.....	.....	.....	.....	.....	.....	51	5,599	.....	.....	51	5,599
Eighth	Detroit, Mich.	116	168,560	3	91	.....	.....	.....	.....	.....	.....	119	168,651	4	4,334	123	172,985
	Chicago, Ill.	169	290,418	4	364	.....	.....	.....	.....	.....	.....	173	290,782	.....	.....	173	290,782
	Duluth, Minn.	139	484,458	2	48	.....	.....	.....	.....	.....	.....	141	484,506	1	659	142	485,165
	Grand Haven, Mich.	86	38,527	7	138	.....	.....	.....	.....	.....	.....	93	38,665	.....	.....	93	38,665
	Marquette, Mich.	51	30,059	.....	.....	.....	.....	1	148	.....	.....	52	30,207	6	2,314	58	32,521
	Milwaukee, Wis.	193	327,579	10	425	.....	.....	.....	.....	.....	.....	203	328,004	.....	.....	203	328,004
	Port Huron, Mich.	80	70,013	.....	.....	.....	.....	.....	.....	.....	.....	80	70,013	4	10,717	84	80,730

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Ninth	Cleveland, Ohio	221	471,797							8	16,174	229	487,971			229	487,971
	Buffalo, N. Y.	285	554,617	1	55			1	107			287	554,779	14	24,458	301	579,237
	Burlington, Vt.	26	3,940									26	3,940	2	701	28	4,641
	Oswego, N. Y.	92	36,188									92	36,188	15	7,092	107	43,280
	Toledo, Ohio	75	111,555	1	23							76	111,578			76	111,578
Tenth	New Orleans, La.	199	40,661	29	1,498			4	4,128	10	2,779	242	49,066	29	124,343	271	173,409
	Apalachicola, Fla.	57	15,296	14	629					1	341	72	16,266	1	1,601	73	17,867
	Galveston, Tex.	52	18,529	11	364			1	838	35	18,776	99	38,507	12	59,060	111	97,567
	Mobile, Ala.	100	9,143	23	781			1	139	10	3,962	134	14,080	6	11,170	140	25,200
	San Juan, P. R.	10	1,847	7	387					2	576	19	2,810	5	14,777	24	17,587
	Total, 1913	6,395	5,109,569	530	26,263	2	2,000	31	14,298	557	492,548	7,515	5,644,678	450	3,427,314	7,965	9,071,992
	Total, 1912	6,432	4,872,532	426	20,843	(a)	(a)	(a)	(a)	502	458,245	b7,398	b6,370,375	438	3,384,905	7,836	8,755,280
	Increase (+) or decrease (−)	−37	+237,037	+104	+5,420	(a)	(a)	(a)	(a)	+55	+34,303	+117	+274,303	+12	+42,409	+129	+316,712

a Data not given in annual report for year ended June 30, 1912, and comparisons can not be made.
b Includes passenger sail vessels and passenger barges taken together.

Vessels Inspected and Officers Licensed During the Fiscal Year Ended June 30, 1913, by Geographical Divisions.

Geographical division.	Domestic vessels.										Foreign passenger steam vessels.		Total.		Officers licensed.			
	Steam vessels.		Motor vessels.		Passenger sail vessels.		Passenger barges.		Seagoing barges.		Total.							
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.	Steam vessels.	Motor vessels.	Sail vessels and barges.	Total.
Pacific coast	916	700,891	109	8,811	2	2,000	3	2,003	20	28,455	1,050	742,160	53	342,110	1,103	1,084,270	2,558	1,788	35	4,381
Atlantic coast	2,936	1,643,455	249	10,392			16	5,703	471	421,485	3,672	2,081,035	296	2,823,185	3,968	4,904,220	7,375	4,455	62	11,892
Western rivers	592	92,031	60	2,257			4	1,232			656	95,520	2	793	658	96,313	1,762	1,095	2	2,859
Northern lakes	1,533	2,587,711	28	1,144			2	255	8	16,174	1,571	2,605,284	46	50,275	1,617	2,655,559	3,224	1,564	1	4,789
Gulf coast	418	85,481	84	3,059			6	5,105	58	26,434	566	120,679	53	210,951	619	331,630	1,302	1,244	15	2,561
Total, 1913	6,395	5,109,569	530	26,263	2	2,000	31	14,298	557	492,548	7,515	5,644,678	450	3,427,314	7,965	9,071,992	16,221	10,146	115	26,482
Total, 1912	6,432	4,872,532	426	20,843	(a)	(a)	(a)	(a)	502	458,245	b7,398	b6,370,375	438	3,384,905	7,836	8,755,280	15,553	12,320	163	28,036
Inc. (+) or dec. (−)	−37	+237,037	+104	+5,420	(a)	(a)	(a)	(a)	+55	+34,303	+117	+274,303	+12	+42,409	+129	+316,712	+668	−2,174	−48	−1,554

a Data not given in annual report for year ended June 30, 1912, and comparisons can not be made.
b Includes passenger sail vessels and passenger barges taken together.

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MISCELLANEOUS INSPECTIONS.

Following is a statement of steam vessels granted letters of approval of designs of boilers, engines, and other operating machinery inspected under act of Congress approved June 9, 1910, not inspected annually, only one inspection made; hulls of United States Government vessels inspected; and boilers in or for United States Government steamers and buildings inspected during the year ended June 30, 1913:

Local inspection district (port).	Steam vessels granted letters of approval.		Government vessels inspected.	Government boilers inspected.	Local inspection district (port).	Steam vessels granted letters of approval.		Government vessels inspected.	Government boilers inspected.
	Number.	*Gross tonnage.*				*Number.*	*Gross tonnage.*		
San Francisco, Cal.	2	80	4	80	Memphis, Tenn.	.....	.....	36	210
Portland, Oreg.	6	166	.....	33	Nashville, Tenn.	.....	.....	.....	12
Seattle, Wash.	3	27	1	37	Pittsburgh, Pa.	1	8	.....	29
Juneau, Alaska.	.....	.....	.....	3	Cincinnati, Ohio.	.....	.....	5	16
St. Michael, Alaska.	1	18	.....	1	Point Pleasant, W. Va.	.....	.....	1	35
Honolulu, Hawaii.	.....	.....	.....	2	Detroit, Mich.	.....	.....	2	13
New York, N. Y.	2	41	3	85	Chicago, Ill.	1	14	.....	4
New Haven, Conn.	1	5	.....	1	Duluth, Minn.	.....	.....	.....	9
Philadelphia, Pa.	3	107	.....	13	Grand Haven, Mich.	11	203	1	4
Norfolk, Va.	2	50	.....	19	Marquette, Mich.	1	17	2	4
Baltimore, Md.	3	64	1	47	Milwaukee, Wis.	4	90	4	22
Charleston, S. C.	.....	.....	.....	26	Port Huron, Mich.	2	23	.....	.....
Jacksonville, Fla.	.....	.....	3	8	Cleveland, Ohio.	1	13	1	1
Savannah, Ga.	.....	.....	1	10	Buffalo, N. Y.	2	56	.....	10
St. Louis, Mo.	.....	.....	.....	61	Oswego, N. Y.	2	53	1	6
Dubuque, Iowa.	1	28	2	74	Toledo, Ohio.	.....	.....	2	5
Boston, Mass.	5	111	.....	29	New Orleans, La.	.....	.....	22	127
Bangor, Me.	2	67	.....	.....	Apalachicola, Fla.	.....	.....	.....	16
New London, Conn.	1	60	.....	19	Galveston, Tex.	.....	.....	3	17
Portland, Me.	1	37	1	22	Mobile, Ala.	.....	.....	1	36
Providence, R. I.	1	6	2	10	San Juan, P. R.	.....	.....	1	5
Louisville, Ky.	.....	.....	.....	46					
Evansville, Ind.	.....	.....	.....	1	Total.	59	1,344	100	1,208

MARINE BOILER PLATES TESTED.

During the year ended June 30, 1913, 3,208 marine boiler plates were tested at the mills by assistant inspectors of this Service, under act of Congress approved January 22, 1894. Of this number, 3,000 were accepted and 208 were rejected, as follows:

Inspected by Assistant Inspector—	Plates rejected because of—										Total.		
	Spoiled at shears after inspection.	Lost in shipping house.	Tensile strength.	Elongation.	Lamination.	Light gauge.	Reduced area.	Bad surface.	Bending test.	Wrong dimensions.	Rejected.	Accepted.	Inspected.
E. G. Allen, Coatesville, Pa.	10	24	17	12	19	5	3	29	5	....	124	1,882	2,006
J. B. Hayward, Pittsburgh, Pa.	8	1	14	....	....	3	21	20	....	....	67	1,012	1,079
S. A. Mills, Philadelphia, Pa.	....	7	2	....	....	....	....	4	....	....	13	77	90
S. H. Hunter, Cleveland, Ohio.	....	....	2	1	....	....	1	....	....	....	4	29	33
Total, 1913.	18	32	35	13	19	8	25	53	5	....	208	3,000	3,208
Total, 1912.	4	6	89	37	12	6	33	41	33	2	263	3,523	3,786
Increase (+) or decrease (−).	+14	+26	−54	−24	+7	+2	−8	+12	−28	−2	−55	−523	−578

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Also there were inspected at the mills a large number of steel bars for braces and stay bolts in marine boilers and several hundred plates for stock and repairs. Many requests from other branches and departments of the Government for tests of material at the mills were complied with and reports rendered to the proper officials.

NEW LIFE PRESERVERS INSPECTED.

During the fiscal year inspectors of this Service inspected new life preservers as follows:

Kind.	Inspected.	Rejected.	Passed.
Block cork	221,193	3,109	218,084
Tule	11,499	.....	11,499
Compressed cork	868	180	688
Balsa wood (A B C)	123	.....	123
Total	233,683	3,289	203,394

The above statement of the number of new life preservers examined shows a decrease from the previous year of 10,882. There was an increase over the previous year of 539 in the number of life preservers rejected.

OFFICERS LICENSED.

There were 26,482 officers of all grades licensed during the fiscal year ended June 30, 1913. The number licensed for each grade, by local districts, is shown in the following table:

Local district.	Masters of steam vessels.	Masters of steam yachts.	Mates of ocean steamers.	Mates of inland steamers.	First-class pilots.	Second-class and special pilots.	Chief engineers.	Assistant engineers.	Special engineers.	Joint pilots and engineers.	Engineers of motor vessels other than steam.	Operators of motor vessels.	Masters of sail vessels of over 700 gross tons.	Mates of sail vessels of over 700 gross tons.	Masters of barges of over 100 gross tons.	Total of all grades.
San Francisco, Cal	398	....	187	13	37	28	427	255	3	1	88	579	3	1	....	2,020
Honolulu, Hawaii	15	....	6	....	2	1	8	7	1	....	6	22	1	....	....	69
Juneau, Alaska	10	....	3	....	....	6	23	2	....	2	14	103	....	....	....	163
Portland, Oreg	110	....	8	23	4	8	125	22	....	2	9	331	2	....	....	644
St. Michael, Alaska	16	....	2	5	1	3	9	1	....	....	4	89	1	....	....	131
Seattle, Wash	268	....	45	39	3	41	316	63	4	5	65	478	21	6	....	1,354
New York, N. Y	879	....	119	23	228	59	1,387	238	....	1	65	931	8	3	2	3,943
Albany, N. Y	60	....	....	15	29	46	169	12	3	....	2	45	....	....	....	381
New Haven, Conn	55	....	....	3	26	24	70	3	....	....	27	182	3	....	....	393
Philadelphia, Pa	174	1	24	12	27	55	284	46	6	....	21	487	7	2	....	1,146
Norfolk, Va	163	....	13	1	37	65	213	38	7	1	11	488	1	....	1	1,039
Baltimore, Md	141	....	38	17	37	61	264	58	7	....	34	416	2	....	....	1,075
Charleston, S. C	49	....	1	2	15	18	63	9	3	4	14	158	1	....	....	337
Jacksonville, Fla	59	....	10	3	11	13	88	9	1	....	25	304	2	....	....	525
Savannah, Ga	53	....	3	3	15	12	70	12	....	....	7	41	2	....	....	218
St. Louis, Mo	74	....	....	29	57	....	122	11	8	....	17	242	....	....	....	560
Dubuque, Iowa	40	....	....	6	13	15	83	13	....	....	20	157	....	....	2	349
Boston, Mass	196	....	68	10	34	70	321	80	9	....	33	320	18	1	....	1,160
Bangor, Me	39	....	3	10	10	29	54	2	2	....	14	238	3	....	....	404
New London, Conn	63	....	....	3	13	6	122	12	1	....	22	176	1	....	....	419
Portland, Me	45	....	12	3	5	23	90	6	2	1	2	191	4	....	....	384
Providence, R. I	75	....	3	6	16	17	128	20	1	....	17	184	1	....	....	468
Louisville, Ky	33	....	....	5	26	2	55	3	4	....	8	55	....	....	....	191
Evansville, Ind	36	....	....	3	19	18	57	1	....	....	3	137	....	....	....	274
Memphis, Tenn	51	....	....	5	17	13	90	3	....	....	2	166	....	....	....	347

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Local district.	Masters of steam vessels.	Masters of steam yachts.	Mates of ocean steamers.	Mates of inland steamers.	First-class pilots.	Second-class and special pilots.	Chief engineers.	Assistant engineers.	Special engineers.	Joint pilots and engineers.	Engineers of motor vessels other than steam.	Operators of motor vessels.	Masters of sail vessels of over 700 gross tons.	Mates of sail vessels of over 700 gross tons.	Masters of barges of over 100 gross tons.	Total of all grades.
Nashville, Tenn.	41	....	....	11	15	4	63	7	5	....	2	74	....	....	....	222
Pittsburgh, Pa.	132	....	....	31	12	6	137	19	5	1	....	73	....	....	....	416
Cincinnati, Ohio	72	....	....	19	25	....	86	11	1	....	2	59	....	....	....	275
Point Pleasant, W. Va.	52	....	....	16	19	....	61	5	....	....	6	72	....	....	....	225
Detroit, Mich.	105	....	....	....	48	15	153	40	2	....	6	94	....	....	....	463
Chicago, Ill.	84	....	....	1	50	30	178	33	....	....	13	216	....	....	....	605
Duluth, Minn.	59	....	....	....	21	11	65	9	1	1	2	44	....	....	....	213
Grand Haven, Mich.	35	....	....	....	20	42	105	16	1	2	4	427	....	....	....	652
Marquette, Mich.	24	....	....	....	20	25	67	2	3	....	1	105	....	....	....	247
Milwaukee, Wis.	83	....	....	....	42	35	132	42	2	....	12	143	....	....	....	541
Port Huron, Mich.	63	....	....	....	40	10	107	50	3	....	....	34	....	....	....	307
Cleveland, Ohio.	90	....	....	....	48	26	193	34	1	....	1	66	....	....	....	459
Buffalo, N. Y.	94	....	....	....	52	61	258	63	2	1	6	88	....	....	1	626
Burlington, Vt.	7	....	....	....	4	13	13	1	2	....	....	50	....	....	....	90
Oswego, N. Y.	34	....	....	....	25	36	84	7	1	1	2	176	....	....	....	366
Toledo, Ohio.	35	....	....	....	8	28	66	9	....	....	1	73	....	....	....	220
New Orleans, La.	211	....	15	26	64	69	264	10	7	2	64	176	1	....	3	912
Apalachicola, Fla.	40	....	4	9	19	11	53	4	....	....	....	31	404	3	....	578
Galveston, Tex.	54	....	13	1	19	17	81	6	5	2	27	283	....	....	1	509
Mobile, Ala.	73	....	2	13	21	37	127	1	....	....	22	206	5	....	....	507
San Juan, P. R.	7	....	....	....	2	1	10	1	1	....	4	27	1	1	....	55
Total, 1913	4,497	1	579	360	1,256	1,110	6,991	1,296	104	27	736	9,410	91	14	10	26,482
Total, 1912	4,550	1	425	316	1,169	924	6,275	1,789	73	31	649	11,671	134	23	6	28,086
Increase	....	....	154	44	87	186	716	....	31	....	87	....	....	....	4	....
Decrease	53	....	....	....	....	....	....	493	....	4	....	2,261	43	9	....	1,554

EXAMINATIONS FOR COLOR BLINDNESS.

During the year ended June 30, 1913, 7,670 applicants for original and renewal of licenses were examined for visual defects, 84 of whom were found color-blind or with other visual defects and rejected, and 7,586 were passed. As compared with the previous year, these figures show an increase of 54 in the number examined and 176 in the number passed.

ACCIDENTS, AND LIVES LOST.

The total number of accidents resulting in loss of life during the fiscal year ended June 30, 1913, was 66, with a total life loss of 436. Classified according to causes, the accidents and deaths are shown in the following table:

Cause.	Accidents.	Lives lost.	Cause.	Accidents.	Lives lost.
Fire	4	7	Accidental drowning	....	135
Collision	22	45	Miscellaneous	....	81
Explosions or accidental escape of steam	13	33	Total	[a] 66	[b] 436
Snags, wrecks, and sinking	27	135			

[a] Increase of 27 over previous year.

[b] Increase of 172 over previous year.

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By supervising inspection districts and by causes, the loss of life was as follows:

Supervising district.	Fire.	Collision.	Explosions or accidental escape of steam.	Snags, wrecks, and sinking.	Accidental drowning.	Miscellaneous.	Total.
First	2	4	3	36	19	19	83
Second	.....	9	5	9	25	13	61
Third	2	23	1	.....	9	9	44
Fourth	.....	.....	.....	.....	3	4	7
Fifth	.....	.....	.....	8	12	5	25
Sixth	.....	5	.....	4	17	1	27
Seventh	.....	.....	.....	1	12	2	15
Eighth	.....	4	7	7	14	9	41
Ninth	.....	.....	.....	.....	9	9	18
Tenth	3	.....	17	70	15	10	115
Total	7	45	33	135	135	81	436

The following disasters resulted in an unusually large loss of life:

On December 12, 1912, while on a voyage from Tampico, Mexico, to Sabine, Tex., the steamer *Perfection* with the barge *S. O. Co. No. 87* in tow encountered a heavy gale, during which the 2-inch steel hawser parted. The steamer was then put about to look for the barge, which was found floating bottom up. The crew of nine men perished.

On January 3, 1913, during a dense fog, the steamer *Julia Luckenbach* collided with the British steamer *Indrakula* in Chesapeake Bay near Tangier Island, causing the sinking of the *Julia Luckenbach*, and making it necessary to beach the *Indrakula*. Sixteen of the crew of the steamer *Julia Luckenbach* lost their lives.

On January 7, 1913, the oil steamer *Rosecrans* was wrecked on Peacock Spit, at the mouth of the Columbia River, Oreg., resulting in the loss of 30 lives.

On January 9, 1913, the explosion of the boiler of the steamer *Jas. T. Staples*, at Mobile, Ala., caused the loss of 15 lives.

On January 25, 1913, the United States local inspectors of steam vessels at Galveston, Tex., reported that the steamship *El Dorado* left Sparrow Point, Md., for Galveston, Tex., with a crew of 39 men on board. The steamship did not arrive at Galveston, nor was it reported as seen or spoken afterwards, and it is supposed to have been lost with all on board.

On February 3, 1913, the steamer *Monarch*, while towing logs through Tchula Lake, Miss., sank, drowning 5 of the crew.

On March 7, 1913, there was an explosion of dynamite aboard the British steamship *Alum Chine*, while lying off Sparrow Point, Patapsco River, Md., causing the death of 8 persons aboard the steamers *Jason* and *Atlantic*, which were in the vicinity of the *Alum Chine*.

On May 2, 1913, the steamer *Concordia*, while proceeding down the Tensas River en route to Natchez, Miss., sank, causing the loss of 22 lives.

Of the total (436) lives lost, 226 were from suicide, accidental drowning, and other similar causes, which leaves 210 that can fairly be chargeable to accident, collision, explosion, or foundering.

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PASSENGERS CARRIED.

During the fiscal year 303,263,033 passengers were carried on steam vessels that are required by law to report the number of passengers carried. Taking the total number of lives lost as 436, it is seen that 695,557 passengers were carried for each life lost, whether of passengers or crew, and from all causes.

PRECAUTIONS AGAINST OVERLOADING OF PASSENGER STEAMERS.

The Bureau has always made an earnest effort to prevent the overloading of steamers carrying passengers, and it is believed that it has succeeded in greatly reducing this practice. There are two factors to be considered in the matter of the number of passengers that steamers are permitted to carry. The first is, Have the inspectors permitted the vessel by her certificate of inspection to carry more passengers than she can safely accommodate? and second, Have the officers of the vessel permitted more passengers to be carried than is allowed by her certificate of inspection? Under section 4464, Revised Statutes, the inspectors are required to state in every certificate of inspection granted to steamers carrying passengers, other than ferryboats, the number of passengers of each class that any such steamer has accommodations for and can carry with prudence and safety, and thus it will be seen that local inspectors have exclusive jurisdiction in the matter of fixing the number of passengers that may be carried on board steamers. In a country such as ours, with so many varied local conditions and so many different types of vessels, this is probably the best arrangement that can be made, but the judgment of all men is not the same, and one inspector may err in permitting a steamer to carry more passengers than its capacity justifies, whereas another may err in not permitting a steamer to carry as many passengers as might be safely and prudently allowed. If it were possible to have a general and uniform rule by which passenger allowance could be estimated, it would be most desirable, but under the varying conditions it is practically impossible to put such a rule in effect. The Bureau, however, has repeatedly warned local inspectors that the responsibility is theirs and that they would be held responsible in the event of disaster, and it is believed that these warnings and instructions have had a good effect. There is one factor, however, by which the allowance of passengers has been substantially controlled, and that is the rules at present in force in regard to lifeboat equipment, for where steamers are boated according to the number of passengers carried they are restricted in their passenger allowance by the extent of their equipment, and consequently can not carry a larger number of passengers than justified by their lifeboat capacity.

The matter of preventing steamers from carrying more passengers than allowed by their certificates of inspection has received particular attention during the present season, and a system of having inspectors actually count passengers and submit reports direct to this office on small cards has been instituted and soon will be in general use by inspectors of this Service and by customs inspectors. This will enable the Department to be in immediate and close touch with the counting of passengers on steamers and do much to prevent

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overloading. It is believed that the counting of passengers should be entirely under the control of the inspectors of this Service, which, of course, would require additional inspectors, because the small number at present available would not be able to take care of this very large and important business.

In this connection I desire to call your attention to the recommendation of the Bureau on page 18 of its annual report for the fiscal year ended June 30, 1905, as follows:

For the purpose of restricting the number of passengers that may be carried on motor vessels other than steam, I would recommend that section 4464, Revised Statutes, be amended so as to read:

"The inspectors shall state in every certificate of inspection granted to vessels carrying passengers, other than ferryboats, the number of passengers of each class that any such vessel has accommodations for, and can carry with prudence and safety."

I would suggest that the word "steamer" in the first line of section 4465, Revised Statutes, be stricken out, and the word "vessel" inserted in lieu thereof, in order to meet the amendment to section 4464.

The same matter is again referred to in the annual report for the fiscal year ended June 30, 1906, on page 15 of which appears the following comment:

Sections 4463, 4464, and 4465, Revised Statutes, referred to in my previous report, should be amended without delay, and in the interest of the safety of the traveling public I beg to renew my former recommendations upon this subject, and earnestly request that you urge upon Congress the necessity of this legislation.

Again, in the annual report for the fiscal year ended June 30, 1907, page 27, this recommendation was renewed in the following language:

Under the present law there is no authority to restrict the number of passengers that may be carried on motor vessels other than steam, and for the purpose of correcting this condition I would recommend that section 4464, Revised Statutes, be amended to read as follows:

"SEC. 4464. The inspectors shall state in every certificate of inspection granted to vessels carrying passengers, other than ferryboats, the number of passengers of each class that any such vessel has accommodations for and can carry with prudence and safety."

For the purpose of harmonizing with this proposed amendment, I would recommend that section 4465, Revised Statutes, be amended by eliminating the word "steamer" in the first line, and substituting therefor the word "vessel."

In the annual report for the fiscal year ended June 30, 1910, on page 14, I again brought to the attention of the Department the matter of the counting of passengers, with the following recommendation:

For many years the responsibility for the counting of passengers on excursion steamers has been divided by reason of the small number of inspectors in this Service, and most of the counting of passengers has been done by customs officers under the authority of section 4496, Revised Statutes. Every season, however, the old question arises as to who shall count passengers, and the same answer is given by this office that the inspectors of this Service will count them as far as they are able, and that the balance of the counting must be done by the customs officers. Thus, it can be plainly seen that in this divided responsibility it is possible for many steamers upon which passengers ought to be counted to escape observation. It is believed, therefore, that the counting of passengers should be brought entirely under this Service, and that there should be appointed a sufficient number of additional inspectors, employed during the season of navigation, to count passengers, particularly on excursion steamers. If this is done, this office will then be able to control absolutely the actions of such inspectors, and the probability of any steamer escaping the count of her passengers will be removed.

HULL INSPECTION.

An examination of the General Rules and Regulations prescribed by the Board of Supervising Inspectors will satisfy anyone that the board has given studious and intelligent attention to the matter of

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boiler construction and inspection. The General Rules and Regulations in this regard are respected and are frequently referred to by various authorities in this and other countries. It is my purpose, however, to increase the efficiency of the hull inspection of the Service. A long step in this direction was taken at the last meeting of the Board of Supervising Inspectors, in January, 1913, when a rule was adopted providing that in the inspection of hulls, boilers, and machinery of vessels the rules promulgated by the American Bureau of Shipping governing material and construction of hulls, boilers, and engines, except where otherwise specially provided for by the Rules and Regulations, will be accepted by inspectors as efficient standards of excellence. This was the first official recognition of the work of the American Bureau of Shipping. It should be a matter of pride to all Americans interested in the development of the American merchant marine to establish a standard of American ship construction that will be distinctly American, and I hope the day will soon come when American shipbuilders will be governed by American standards and American specifications.

There is already in the General Rules and Regulations a requirement that the owner of every new vessel of over 100 gross tons, when making application for first inspection of the vessel, shall furnish the local inspectors of the district where the vessel is to be inspected drawings or blue prints, in plan and section, showing fully the general construction of the vessel, of wood, iron, or steel, including dimensions, spacing of frames, disposition of hull plates, outside and in, or of outside and inside planks, construction of decks, construction of transverse and longitudinal bulkheads and location of same, space between decks, and details of principal scarfs; and the owners are also required to furnish details of the shapes, dimensions, and unit weights of all structural parts of the hull and of the kinds of material of which made, including kinds of wood. A full description of the riveting of all parts of an iron or steel hull must be furnished. These data in the hands of the local inspectors enable them more intelligently to examine the hulls of vessels, and in after years, as a vessel goes from one district to another, to keep in touch with it with a view to determining exactly the extent of deterioration.

The effect of the increase in the number of details and items required in hull inspections has been most beneficial, and a comparison of the Rules and Regulations in force to-day with those of 10 years ago will show that the Service has made steady progress in the direction of effective and intelligent hull inspection.

REINSPECTIONS.

While it is necessary that local inspectors make very rigid examination of vessels at the annual inspection, it must be apparent that no matter how rigorous the annual inspection may be steamers would not be kept in good condition were it not for the reinspections required by this Service. Every excursion and ferry steamer is reinspected at least three times during the year for which the certificate of inspection was issued, or during the season of navigation, and while these reinspections require an increased expenditure in the operations of the Service the added expense is more than justified

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by the results obtained. The Bureau requires that there be sent to the office in Washington card reports showing the results of these reinspections. The cards heretofore used required the inspector to state only whether the condition of the vessel was good, but the cards now in use call for information respecting certain details that an inspector must supply, showing upon what he bases his opinion that the condition of the vessel is good or otherwise. A particular feature of the reinspection card is one requiring inspectors to report the numbers painted upon the lifeboats that are actually swung out. This office is not satisfied with the statement that one, two, three, or four lifeboats were swung out, but requires the numbers painted upon those lifeboats to be given, so that the office in Washington may know whether local inspectors are swinging out the same lifeboats at each inspection, or whether they are, as they should, swinging out different boats at each reinspection.

It is useless, however, to have in the General Rules and Regulations requirements for detailed hull and boiler inspection if the Service has not a sufficient number of men to see that these details are looked after. It is necessary, therefore, that additional inspectors be provided at certain ports. Six of these should be appointed at New York, N. Y.—three inspectors of hulls and three inspectors of boilers. The number of vessels and the amount of work in the local district of New York is very large, and the inspection of these vessels in detail can not be looked after unless the local inspectors there have a sufficient number of assistants. There should be two additional inspectors (one inspector of hulls and one inspector of boilers) at Boston, Mass., which district also has a large volume of business. The same increase in the force should be made at Seattle, Wash., which port has grown rapidly in recent years, and whose volume of business is constantly increasing. The amount of work at Buffalo, N. Y., also is large, and it has been necessary in the last two years to detail assistant inspectors from the Eighth to the Ninth district to assist in making the spring inspections. About one-third of the American merchant marine is on the Great Lakes, and in no other part of the country are better vessels to be found. The population contiguous to the Lakes is constantly increasing and the number of passengers carried on this water system is very large. It is necessary, therefore, to relieve the congested conditions of inspection that arise each spring as a result of the peculiar conditions that exist on the Great Lakes. This can, to a large extent, be relieved by increasing the inspection force at Buffalo, and it is earnestly recommended that two additional inspectors (an inspector of hulls and an inspector of boilers) be assigned to that port.

TRAVELING INSPECTORS.

The supervising inspectors of steam vessels do considerable traveling in their districts, with a view to obtaining uniform administration of law therein, but the Service should have a corps of traveling inspectors, who, working under the direction of this office, could do excellent work in making reinspections, and the Department would thereby be in closer and more intelligent touch, not only with the local inspectors but with the supervising inspectors.

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MOTOR VESSELS.

I have, in previous reports, referred to the desirability of the extension of the inspection of motor boats. I believe that every motor vessel used for carrying passengers should be inspected by the local inspectors of steamboats and given certificates of inspection. This inspection need not be made in such detail as that of a steamer, but it should be sufficiently extensive and thorough to assure the passengers that such boats are actually in good condition. The inspection would not put the owner of the boat to any expense and is objected to only because it has been thought that it would interfere with the liberty and freedom of movement of the owners of such motor vessels not now subject to inspection.

It should be borne in mind also that reckless navigation of an uninspected motor vessel jeopardizes the lives of persons on inspected vessels as much as the lives of those on the motor vessel. The enormous number of motor vessels that are not subject to inspection and over which the Government has no authority respecting the number of passengers they may carry increases the perils of navigation.

At many pleasure resorts one can see every day during the season of navigation overloaded motor boats that are endangering the lives of passengers who think they are perfectly safe because the men in charge of the boats hold operator's licenses, which were obtained without any examination.

To obtain a license as operator of motor vessels a person is not at present required to be a citizen of the United States, 21 years of age, or able to read or write, and yet we place in the hands of such a person copies of the pilot rules, which are useless to him if he is not able to read. Under the law licenses as operators of motor boats are issued without any examination whatever. The inspectors of this Service are without authority to ask any questions as to whether the person applying for such license is color blind or whether he understands the pilot rules, and yet this person having in his hands a license as operator from inspectors of this Service goes out and takes charge of motor vessels carrying passengers for hire. It is submitted that operators of motor boats should be required to pass an examination as to their color sense and visual acuity, and also as to their knowledge of the pilot rules and laws.

In this connection I desire to call your attention to the annual report for the fiscal year ended June 30, 1904, wherein, on page 12, it is stated:

> During the fiscal year ended June 30, 1904, there were 206 motor vessels inspected with a capacity of 9,391 tons, which is an increase over previous fiscal year of 53 vessels, with increase of 2,541 in tonnage. In this connection I desire to call attention to the fact of the small number of motor vessels that come under the jurisdiction of this Service under the present law, as compared with the numerous vessels of this class that, without any of the restrictions of law which govern and regulate the careful navigation of all vessels propelled by steam power; and all vessels of above 15 gross tons propelled by naphtha, gas, and other such means of propulsion carrying freight or passengers for hire, are permitted to navigate and compete with regularly licensed vessels carrying licensed officers, and are a constant menace to the lives and property not only of those employing them, but to those vessels regularly inspected and licensed by the Government. It is sincerely to be hoped that the early action of Congress will place some proper restrictions on all these motor vessels, making them equally responsible to the public for safe navigation as other vessels now under the supervision of the inspection laws.

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Again, in the annual report for the fiscal year ended June 30, 1905, the attention of the Department was called to the motor-boat situation, with a recommendation beginning on page 10, which reads as follows:

There is no good reason why a vessel propelled by a motor other than steam should be exempted from any of the requirements demanded of a steam vessel, or should be granted privileges not accorded others, and aside from the fact that such discrimination is unfair and unjust to the owners of other vessels who are obliged to equip and man their vessels in accordance with the law, the same discrimination applies to the passengers who risk the dangers and vicissitudes of marine transportation and are subjected to the additional chance of accident consequent upon the careless navigation of these exempted motor vessels. They carry no licensed officers, but are generally under the care of those who have no regard for the rights or safety of others, simply because there is no authority to demand it. Safety of life and property under all conditions should be the concern of the Government, and the traveling public should be as fully protected against the unskillful navigation of any power boat as it is against the indifferent operation of a steamboat. Passengers upon steamboats should not be placed at the mercy of unlicensed, inexperienced men directing the movements of some craft that may prove the destruction of the vessel that is fully manned, thoroughly equipped, and carefully navigated by competent and reliable licensed officers; neither is it fair to subject these licensed officers to the possibility of collision with a vessel that is navigated by persons who are not responsible to any authority.

In the annual report for the fiscal year ended June 30, 1907, the matter is again referred to on page 14 as follows:

By reference to the statistics of inspection of the different classes of vessels (p. 10), it is shown that there was a decrease from the previous year of 55 in number and 644 in tonnage of motor vessels inspected, a most remarkable showing when the fact is considered that the annual increase in the number of these vessels is enormous and that they are undoubtedly entering largely into commercial trade.

In the early history of these vessels they were operated almost entirely for pleasure, and but few of them were engaged in carrying freight or passengers for hire; but their adaptability and utility for nearly all commercial purposes in the way of marine transportation has encouraged their building and operation. If they are of 15 tons or less they are subject to no inspection whatever and are not required to carry licensed officers, except in the case of carrying passengers for hire, when it is only necessary that they shall have a licensed operator and have a life preserver on board for each passenger carried. No examination is necessary under the law as a requisite for securing this "operator's" license, and we are now licensing the incompetency that we formerly deprecated and condemned. If these vessels are used for pleasure purposes only, they are exempted entirely from the restrictions applying to steam vessels, so far as inspection and carrying licensed officers are concerned, no matter what their size or the waters they navigate. If they are engaged in passenger service, the number of their passengers can not be restricted, as section 4464, Revised Statutes, governing this condition, applies only to steam vessels.

Vessels of any character of less than 5 tons are not licensed or enrolled by the customs authorities, and as a consequence there are thousands of motor boats under 5 tons that have no name and practically no identity whatever so far as the purposes of this Service are concerned, many of which are, no doubt, carrying passengers for hire, yet we have no record of these vessels and have no official knowledge of their existence.

In the annual report for the fiscal year ended June 30, 1909, pages 13 and 14, the motor-vessel question is referred to in the following language:

The number of motor vessels steadily increases, and it becomes more and more apparent that the jurisdiction of this Service must be extended in the direction of their supervision. While many persons operate motor vessels with considerable skill and care, it is nevertheless apparent that a large number of them make very poor students of the rules of navigation. Some of these by their carelessness endanger not only their own lives, but also the lives of persons traveling upon steam vessels, and in strenuous endeavors to avoid collision with them the licensed officers of steam vessels are sometimes forced to endanger the safety of their vessels.

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In the annual report for the fiscal year ended June 30, 1910, pages 13 and 14, I made the following recommendation regarding the desirability for the inspection of motor vessels:

The time has come when every motor vessel, regardless of size and of the purpose for which used, should be inspected or examined by this Service. It is not proposed that there be made an inspection of so detailed a character as that at present required of steamers and other vessels subject to the jurisdiction of this Service, but that there be a sufficient inspection or examination to ascertain whether they are equipped with the proper lights and life-saving apparatus and the fuel tanks and engine are properly installed. It is believed that such an inspection would be a protection to the lives of both the persons who travel in motor boats and those who travel in other vessels, for while many of the operators of motor vessels are very expert, and are perfectly at home when navigating such vessels, the lives of persons traveling by other vessels are often jeopardized by reason of the fact that many of the operators of motor vessels do not even know the rules of the road.

If a law were enacted which required inspectors of this Service to visit motor vessels, examine their equipment, and issue a certificate of inspection to the owners thereof, it would result also in protecting the owners of such boats from incurring the fine that is at present imposed for the violation of the act of June 9, 1910. This Service has observed that the operators or owners of motor vessels do not willfully violate the law so much as they do through ignorance of it, and as the purpose of modern government is to prevent violations thereof rather than to apprehend and punish the violators, it is believed that the persons who would be most protected by the proposed inspection are the owners and operators of such craft.

It has been noted also that some very small motor vessels are navigated upon routes for which they are not fitted. This is another feature of motor-boat navigation that should be controlled by authorizing this Service to designate the waters upon which certain craft may navigate.

At present the law requires that a motor boat carrying passengers for hire shall be in charge of a licensed operator. In my opinion the law should go a step further and require that every motor boat, whether used for pleasure, transportation of passengers or freight, or towing, be in charge of a licensed operator. Also all operators of motor boats should be required to submit to examinations which would test their knowledge of the rules of the road, demonstrate that they are free from color-blindness, and ascertain whether they have had sufficient experience in the operation of such craft to justify the issuance of a license. At present the law does not require such an examination, and as a result the Service is placed in the peculiar position of legalizing the acts of many incompetent persons.

If the legislation suggested were enacted, it would be necessary to appoint in this Service additional inspectors and clerks, the services of the latter of whom would be required in making out the certificates of inspection that the Service proposes to give such motor boats, but the number would not be very large, and the increased safety to life would more than compensate for the extra cost incident to their employment.

In the annual report for the fiscal year ended June 30, 1911, reference is again made to the matter of the inspection of motor vessels, on page 14, as follows:

Reference has been made above to the licensing by this Service of persons who desire to become operators of motor vessels carrying passengers for hire under the provisions of the act of Congress approved June 9, 1910, which act also provides that any such license as operator of motor boats shall be revoked or suspended by the local board of inspectors for misconduct, gross negligence, recklessness in navigation, intemperance, or violation of law on the part of the holder, and while therefore the vast majority of motor boats are not subject to inspection, the Service does have a certain jurisdiction over persons holding licenses as operators of motor boats.

At present no examination is required as the condition of obtaining such license, and it must be apparent to anyone who gives the matter thought that many persons have received license to operate motor boats who are in fact not competent to hold such license and who jeopardize not only their own life and the lives of persons traveling with them, but also the lives of persons traveling on inspected steamers commanded by duly licensed men, and it does seem that as a matter of public policy, for the purpose of protecting life and property, the operators of motor boats should be required to pass a suitable examination before receiving license. One does not have to travel far from this city to observe instances of operators of motor boats violating the rules of the

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road and navigating their vessels without the proper lights and equipment, as required by the act of Congress approved June 9, 1910.

It should be stated, however, that the provisions of the act of Congress approved June 9, 1910, are now better understood, and it is believed that in the course of the next year or two the vast majority of persons owning motor boats will know at least certain principal rules with which they must comply in order not to violate the law.

In the annual report for the fiscal year ended June 30, 1912, page 18, attention is again invited to this matter, and the following recommendation made:

I have on previous occasions stated that motor vessels should be subject to the inspection of this Service, and I now again state that they should be subject to inspection. Could motor vessels be inspected and certificates of inspection be issued to them, the result would be that the operators of motor vessels would know exactly what is required to be carried on board of them, and I believe that the motor-vessel people themselves, could inspection once be had, would support the efforts of this Service for safer conditions in this respect.

At the present time there is a most unjust competition between motor boats carrying passengers and small steamers carrying passengers, and the persons who own these steamers which are subject to inspection write asking why it is that motor boats may carry as many persons as can possibly be placed on board whereas the inspected steamers of only a little larger size are restricted to a very much smaller number. As the law at present stands, however, this Service can not correct a dangerous condition that will sooner or later result in loss of life and property.

TRANSPORTATION OF DANGEROUS ARTICLES.

By section 4472, Revised Statutes, the Steamboat-Inspection Service is given a certain control and jurisdiction over the transportation of dangerous articles, but this control is confined to steamers carrying passengers and does not extend to freight vessels. Dangerous conditions may arise in the transportation of articles that are not covered by section 4472, and the section should be amended so as to give this Service certain control over the entire situation with authority to make regulations covering the water transportation of dangerous articles in somewhat the same manner as the Interstate Commerce Commission makes regulations covering the rail transportation of such articles. While there is not the same danger incident to the transportation of dangerous articles on freight steamers as on passenger steamers, because there is not so large a number of persons on board freight steamers, nevertheless it is apparent that if an explosion should occur on a freight steamer while passenger steamers were navigating near by the loss of life would be very great.

The danger of uncontrolled and unregulated carrying of dangerous articles on vessels is evidenced in the case of the explosion of dynamite on British steamship *Alum Chine*, on March 7, 1913, while lying off Sparrow Point, Patapsco River, causing the death of eight persons on the steamers *Jason* and *Atlantic*, which were in the vicinity of the *Alum Chine*.

The Service has always been very particular about enforcing the provisions of the statutes in regard to the transportation of gasoline on steamers carrying passengers. The principal danger in the transportation of gasoline is from automobiles transported on steamers carrying passengers. Under the provisions of section 4472, the transportation of gasoline by steam vessels when such gasoline is carried by motor vehicles (commonly known as automobiles) is not prohibited, but it is provided that all fire in such vehicles shall be

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extinguished immediately after the vehicles enter vessels and that the fire shall not be relighted until immediately before the vehicles leave the vessels. The statutes further provide that any owner, master, agent, or other person having charge of a passenger steam vessel shall have the right to refuse to transport motor vehicles the tanks of which contain gasoline, naphtha, or other dangerous burning fluids, and so much do steamboat companies fear the dangers of gasoline that many of them refuse to carry automobiles that have gasoline in their tanks. Chauffeurs, however, endeavor at times to evade the vigilance of the officers of steam vessels and violate the statutes, thereby jeopardizing the lives of many persons traveling on steamers.

The Bureau believes that the officers in charge of steam vessels as well as the inspectors of this Service make earnest efforts to see that the rule in regard to the transportation of gasoline on steamers carrying passengers is not violated, in which efforts every good and public-spirited citizen should cooperate to the end that lives and property on such steamers may be safeguarded.

DIVISION OF FIRST SUPERVISING INSPECTION DISTRICT.

The first supervising inspection district embraces all waters and rivers of the United States west of the Rocky Mountains, and the Hawaiian Islands. The supervising inspector stationed at San Francisco, Cal., has charge of the local inspection districts of San Francisco, Cal., Los Angeles, Cal., Portland, Oreg., Seattle, Wash., St. Michael, Alaska, Juneau, Alaska, and Honolulu, Hawaii. The territory covered by this district is enormous, and no one man, no matter how efficient he may be, can supervise it properly. It is believed, therefore, that the work of the first supervising district should be divided, and the supervising inspector stationed at San Francisco should be required to supervise only the local districts of San Francisco, Los Angeles, and Honolulu. A new supervising inspector should be stationed at Seattle, Wash., to supervise the local districts of Seattle, Portland, St. Michael, and Juneau. This would permit more efficient supervision of the work in this territory. In the estimates for the fiscal year 1915 the Department has asked for an additional supervising inspector, and if Congress makes an appropriation for the salary of this officer he will be assigned to duty as above described. In order to provide for such an additional supervising inspector it will be necessary that section 4404, Revised Statutes, be amended to that effect.

The estimates of the Bureau for the next fiscal year provide for dividing the first supervising inspection district, as set forth in another part of this report. I trust this will have the approval of the Department and of Congress.

At the last session of Congress provision was made for the establishment of a board of local inspectors at Los Angeles, Cal., but no appropriation was made for the salaries of this board or for a clerk to be assigned to it. As soon as Congress makes provision for the salaries and expenses of this board the Bureau will take immediate steps toward its organization.

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BOARD OF SUPERVISING INSPECTORS.

Section 4405, Revised Statutes, provides for a meeting annually of the supervising inspectors and the Supervising Inspector General of this Service as a Board of Supervising Inspectors. In a country as great as this, and with so many varied local and geographical conditions to be understood and met, it is necessary that there be some body, composed of men who are acquainted with local conditions, which shall have authority to pass certain rules and regulations and suggest proper legislation in regard to the inspection of vessels and the licensing of officers. The Board of Supervising Inspectors has met this responsibility, and has in the years of its existence passed rules and regulations that compare favorably with similar legislation in foreign countries.

Section 4405, Revised Statutes, also confers authority on the Secretary of Commerce to call meetings of an executive committee of the Board of Supervising Inspectors. This authority is necessary and has proven most beneficial, as the committee is able to make rules to meet unforeseen conditions that arise between the annual meetings of the Board of Supervising Inspectors. During the last year three meetings of this committee were held.

CERTIFICATES OF INSPECTION.

I do not believe it is necessary to furnish steamers the large number of copies of certificates of inspection required by present practice. The same purpose would be served if local inspectors furnished the original certificate direct to the vessel, supplying the collector or chief officer of customs with a copy thereof. The result would be a saving in the number of copies of certificates of inspection used, and the original copy could be furnished the master or owner of the vessel, which should always have been the practice. I recommend that the law be amended in this respect.

CHANGE OF NAME OF SERVICE.

In my annual report for last year, in speaking of the activities of the Steamboat-Inspection Service, I pointed out how varied its work is. To-day it does more than inspect steam vessels, and therefore the name "Steamboat-Inspection Service" does not correctly describe the activities of the Service. I recommend that the necessary legislation be introduced to change the name to Marine-Inspection Service instead of Steamboat-Inspection Service.

SUPERVISING INSPECTOR GENERAL'S OFFICE.

The Supervising Inspector General, as required by law, gives his attention to the important matter of obtaining uniform administration of the steamboat-inspection laws and the General Rules and Regulations passed by the Board of Supervising Inspectors. The central office does this in part by rulings that are sent monthly to the Service and to the various interests of the merchant marine. It also publishes excerpts of letters to its inspectors in regard to matters

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that relate to the procedure of the Service, and in this way during the past year a greater uniformity has been obtained in the administration than ever before.

Uniformity of procedure is also obtained through the excellent card index systems which have been installed in the Bureau and in the offices of the local and supervising inspectors. For instance, to such an extent is uniformity required that it is possible for a clerk in the office of the local inspectors at New Orleans, La., to be transferred to the office of the local inspectors at New York, N. Y., and be familiar with the routine duties of that office. The matter of uniformity in clerical work, however, is really the least important. It is more important to obtain uniform inspection, and the Bureau obtains that result to a certain extent through its card system. To illustrate: Whenever a certificate of inspection of a vessel is issued, the local inspectors are required to file in their office a card entitled "Record of annual inspection" and forward a copy of that card to the Bureau at Washington. This card record of annual inspection contains data giving the name of the vessel, class and gross tonnage, the date inspection was completed, the local district in which inspected, the local district where previously inspected, the place where inspected, when hull was built, the date when same was rebuilt, the date when boilers were built, the date when boilers were rebuilt, the kind of service and the character of route, the number of passengers allowed, the number of officers and crew allowed, the name of the owner and his address, and detailed information in regard to the lifeboat equipment. With such a system the Bureau is in close and immediate touch with the local inspectors in the most outlying districts of the Service, and can by a careful examination of such cards ascertain whether inspectors are proceeding in the same manner at all places. When certificates of inspection are indorsed or amended, local inspectors are also required to furnish the central office with card reports setting forth the nature of such indorsement or amendment.

Whenever an officer's license is issued by the local inspectors, they are required to file in their office a card-form record of the license issued, copy of which is sent to the Bureau at Washington. This enables the Bureau to have an alphabetical index of all persons receiving licenses from this Service. These cards contain information as to the name and address of any person licensed, whether naturalized or native, the class and grade of the license, the location of the board of local inspectors issuing same, the date of issue and number of former license, the date and number of issue of the new license, and the waters for which license is issued; and as indorsements are made from time to time upon such a license local inspectors are required to file in their office a record of such indorsements and forward to the Bureau at Washington a copy of the card record of indorsement. Thus, as in the case of certificates of inspection, the Bureau at Washington is in intimate touch with all of the local inspectors, and can ascertain if they are proceeding uniformly in all districts and are obeying the rules and regulations in regard to the issuing of licenses.

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The Bureau requires local inspectors to submit reports of all casualties and violations of the steamboat-inspection laws, and it has a follow-up system by which it requires the inspectors to submit upon card forms the results of such investigations as they may conduct. The Bureau is able to ascertain through these casualty reports whether there is uniform administration in the matter of reporting violations and in taking necessary action incident thereto.

Local inspectors are required to file in their offices daily card records of work done, and to forward to the Bureau at Washington at the end of each day copies of these cards. By this method the Bureau is in close touch with the daily events in all the local districts.

Reference has heretofore been made to the need of traveling inspectors. If such inspectors were provided the Bureau could through them obtain still greater uniformity in the administration of the steamboat-inspection laws.

The foregoing description of the card index system of the Bureau shows the value of this system in obtaining uniform results. There is, however, not a sufficient number of clerks in the office at Washington to check the cards as rigorously as should be done. The Bureau has therefore asked for an additional clerk at $900 per annum, and if this clerk is allowed by Congress it will be possible to check up closely the vessel-inspection, license, casualty, and daily cards that are now received, and thereby to correct errors which it can not at present take note of, because the clerks who file the cards have as much as they can do, in connection with their other office work, to see that the important features are correct and to place the cards alphabetically in the cabinets.

CONDITION OF THE SERVICE.

If what has been said in the first part of this report is true, if the Service is receiving the attention of the central office that is claimed, if the card index systems are as effective as they are said to be, if the inspectors are efficient as it is believed they are, then it must follow that the work of the Steamboat-Inspection Service is effective, and if the number of persons carried on vessels subject to inspection is compared with the number of lives lost it will be seen that the loss of life is relatively very small. The Service exists for the purpose of safeguarding and protecting life and property, and the statistics prove that this purpose has been attained. There is no Government service of which I have any knowledge that is more excellently organized with a view to obtaining prompt compliance with orders from the Department at Washington. It could not be otherwise, for where the central office keeps in such close touch with its field offices, that centralization which is so necessary for uniformity must result, and this Bureau has that centralized authority that reaches out and touches all things in all of the districts, to the end that the whole Service works as one man. It is not meant that there are not some differences of detail in districts. Such differences exist in the various court jurisdictions, and the whole spirit of our governmental life is such that there are certain questions of local adminis-

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tration that must be left to local authorities, but upon all the great questions and upon all matters of general administration and procedure the Bureau insists upon uniform administration and in this respect the condition of the Service is most excellent.

APPENDIX.

There is attached hereto an appendix containing general statistics of the Service compiled from the report of the supervising inspectors of the various districts for the year ended June 30, 1913, indicating the nature and extent of the work of the Service.[a]

Respectfully,

GEO. UHLER,
Supervising Inspector General.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

[a] Appendix is published in the pamphlet edition of the report of the Supervising Inspector General, but omitted from this volume.

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REPORT

OF THE

COMMISSIONER OF NAVIGATION

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REPORT

OF THE

COMMISSIONER OF NAVIGATION.

DEPARTMENT OF COMMERCE,
BUREAU OF NAVIGATION,
Washington, October 25, 1913.

SIR: There is submitted herewith my annual report for the fiscal year ended June 30, 1913.

The year has been one of steady and symmetrical growth in practically all branches of the merchant marine. On June 30 the total tonnage of our merchant marine was 7,886,518 gross tons, the largest in our history. This tonnage exceeds the combined tonnage recorded in Lloyd's Register for 1913 under the German flag (5,082,061 tons) and under the Norwegian flag (2,457,890 tons) and, excepting the British Empire, greatly exceeds the tonnage of any other three nations combined. The total tonnage under the British flag is recorded by Lloyd's at 20,431,543 tons (steam, gross; sail, net). The merchant shipping of these nations is employed almost wholly on the sea, while of the American tonnage given 2,939,786 gross tons are on the Great Lakes. The tonnage documented at our Pacific coast ports for the first time in our history exceeds 1,000,000 gross tons. The most satisfactory statement in the statistical tables submitted is the record of 1,027,776 gross tons registered for foreign trade. Our growth has usually been in the coastwise or domestic trade, and 27 years have elapsed since we registered for foreign trade so large a tonnage as at present. Registered tonnage, it will be noted, furnishes over half of this year's increase.

STATISTICS FOR THE YEAR.

On June 30, 1913, the merchant marine of the United States, including all kinds of documented shipping, comprised 27,070 vessels of 7,886,518 gross tons. On June 30, 1912, it comprised 26,528 vessels of 7,714,183 gross tons. The following table shows the geographical distribution, motive power, material of construction, and trade of vessels of the United States for the fiscal year 1913 in comparison with similar data for the year 1912, and also the construction for the two years:

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Comparison of Merchant Marine of 1912 and 1913.

Classification.	1912		1913	
GEOGRAPHICAL DISTRIBUTION.	*Number.*	*Gross tons.*	*Number.*	*Gross tons.*
Atlantic and Gulf coasts	16,874	3,625,525	16,924	3,743,354
Porto Rico	103	7,941	113	7,774
Pacific coast	4,254	963,319	4,577	1,028,550
Hawaii	47	21,494	48	20,746
Northern lakes	3,367	2,949,924	3,447	2,939,786
Western rivers	1,883	145,980	1,961	146,308
Total	26,528	7,714,183	27,070	7,886,518
POWER AND MATERIAL.				
Sail:				
Wood	7,442	1,279,633	6,901	1,238,594
Metal	140	259,214	144	269,036
Total	7,582	1,538,847	7,045	1,507,630
Steam:				
Wood	12,192	1,111,905	12,929	1,108,773
Metal	2,073	4,067,953	2,154	4,226,239
Total	14,265	5,179,858	15,083	5,335,541
Canal, wood	665	72,567	698	76,619
Barges:				
Wood	3,842	817,528	4,056	853,626
Metal	174	105,383	188	113,102
Total	4,016	922,911	4,244	966,728
Grand total	26,528	7,714,183	27,070	7,886,518
TRADE.				
Registered:				
Sail—				
Wood	418	172,693	475	203,053
Metal	20	36,088	21	36,922
Total	438	208,781	496	239,975
Steam—				
Wood	540	71,005	656	81,287
Metal	161	548,701	171	589,861
Total	701	619,706	827	671,148
Barges—				
Wood	855	97,254	965	110,658
Metal	18	6,360	17	5,995
Total	873	103,614	982	116,653
Total registered	2,012	932,101	2,305	1,027,776
Enrolled and licensed:				
Sail—				
Wood	7,024	1,106,940	6,426	1,035,541
Metal	120	223,126	123	232,114
Total	7,144	1,330,066	6,549	1,267,655
Steam—				
Wood	11,652	1,040,900	12,278	1,027,995
Metal	1,912	3,519,252	1,983	3,636,398
Total	13,564	4,560,152	14,256	4,664,393
Canal, wood	665	72,567	698	76,619
Barges—				
Wood	2,987	720,274	3,092	742,968
Metal	156	99,023	170	107,107
Total	3,143	819,297	3,260	850,075
Total enrolled and licensed	24,516	6,782,082	24,765	6,858,742
Grand total	26,528	7,714,183	27,070	7,886,518

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COMPARISON OF MERCHANT MARINE OF 1912 AND 1913—Continued.

Classification.	1912		1913	
CONSTRUCTION DURING THE YEAR.				
Geographical distribution.	*Number.*	*Gross tons.*	*Number.*	*Gross tons.*
Atlantic and Gulf coasts	545	104,264	597	202,394
Porto Rico	10	117	14	269
Pacific coast	519	32,048	409	44,589
Hawaii	2	56	2	75
Northern lakes	224	90,898	219	90,907
Western rivers	205	5,286	234	7,930
Total	1,505	232,669	1,475	346,155
Power and material.				
Sail:				
Wood	90	15,124	66	15,610
Metal	5	6,097	6	13,000
Total	95	21,221	72	28,610
Steam:				
Wood	970	34,312	900	37,723
Metal	81	119,181	104	205,685
Total	1,051	153,493	1,004	243,408
Canal, wood	27	2,978	39	4,641
Barges:				
Wood	314	44,374	339	56,509
Metal	18	10,603	21	12,987
Total	332	54,977	360	69,496
Total construction	1,505	232,669	1,475	346,155

ANALYSIS OF THE YEAR'S CONSTRUCTION.

During the past fiscal year 1,475 vessels of 346,155 gross tons were built and documented in the United States, compared with 1,505 vessels of 232,669 gross tons for the previous year. The construction for the year was not quite equal to the anticipations of last year's report, and shipbuilding on the Great Lakes shows no appreciable increase over last year, because, as noted heretofore, the large output of the Lake yards several years ago and the higher efficiency of the vessels built then brought the supply of tonnage in those waters somewhat in advance of the demand.

The salient features of the year's construction readily appear from the following table of vessels of 1,000 gross tons or upward built and documented during the year. These 61 vessels aggregate 56 per cent of the total construction in the United States.

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VESSELS OF 1,000 GROSS TONS AND OVER BUILT IN THE UNITED STATES AND DOCUMENTED DURING THE YEAR ENDED JUNE 30, 1913.

Name.	Gross tons.	Where built.
SEABOARD.		
Steel steamers.		
Dakotan	6,657	Sparrow Point, Md.
Minnesotan	6,655	Do.
Montanan	6,649	Do.
Pennsylvanian	6,649	Do.
Illinois	5,225	Newport News, Va.
Gulfoil	5,188	Camden, N. J.
Lenape	5,179	Newport News, Va.
Santa Cruz	5,081	Philadelphia, Pa.
Nelson	4,746	Quincy, Mass.
Middlesex	4,727	Camden, N. J.
Berkshire	4,300	Hoboken, N. J.
Rayo	3,663	Camden, N. J.
El Segundo	3,663	Do.
Socony	3,663	Do.
Vesta	3,633	Do.
Norfolk	3,521	Do.
Camino	3,308	Long Beach, Cal.
Carolyn	3,140	Newport News, Va.
Washington Irving	3,104	Camden, N. J.
Peter H. Crowell	3,101	Newport News, Va.
Frieda	2,993	Quincy, Mass.
Edgar H. Vance	2,521	Long Beach, Cal.
John A. Hooper	2,244	Wilmington, Del.
Adeline Smith	2,168	Newport News, Va.
Columbia	1,923	Wilmington, Del.
Oliver J. Olson	1,881	Do.
William Chatham	1,600	San Francisco, Cal.
Henry T. Scott	1,596	Do.
Paraiso	1,383	Long Beach, Cal.
Grace Dollar	1,327	Do.
Niagara	1,250	Newburgh, N. Y.
Cricket	1,136	Alameda, Cal.
Talbot	1,090	Sparrow Point, Md.
Dorchester	1,085	Do.
Total (34)	116,079	
Wooden steamers.		
York	1,152	Wilmington, Del.
Fort Sutten	1,139	San Francisco, Cal.
San Ramon	1,002	North Bend, Oreg.
Total (3)	3,293	
Wooden schooners.		
Irwin	1,304	Bath, Me.
Maine	1,110	Do.
Total (2)	2,414	
GREAT LAKES.		
Steel steamers, Lake trade.		
James A. Farrell	7,705	Lorain, Ohio.
Richard Trimble	7,607	Do.
Percival Roberts, jr	7,593	Do.
Seeandbee	6,381	Wyandotte, Mich.
Boston	4,184	Ecorse, Mich.
Sainte Marie	2,383	Toledo, Ohio.
North American	2,317	Ecorse, Mich.
A. D. McTier	1,706	Wyandotte, Mich.
F. P. Jones	1,706	Do.
Total (9)	41,582	
Steel barge.		
Manitowoc	2,065	Manitowoc, Wis.

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VESSELS OF 1,000 GROSS TONS AND OVER BUILT IN THE UNITED STATES AND DOCUMENTED DURING THE YEAR ENDED JUNE 30, 1913—Continued.

Name.	Gross tons.	Where built.
GREAT LAKES—continued.		
Steel steamers, ocean trade.		
A. A. Raven	2,551	Ecorse, Mich.
Ruby	2,551	Do.
Edison Light	2,549	Ashtabula, Ohio.
George Hawley	2,549	Do.
Robert M. Thompson	2,458	Ecorse, Mich.
George E. Warren	2,306	Toledo, Ohio.
L. V. Stoddard	2,306	Do.
Total (7)	17,270	
Steel schooner barges.		
S. O. Co. No. 83	2,440	Cleveland, Ohio.
S. O. Co. No. 84	2,441	Do.
S. O. Co. No. 85	2,441	Lorain, Ohio.
S. O. Co. No. 89	2,452	Do.
S. O. Co. No. 90	2,451	Do.
Total (5)	12,225	
Grand total (61)	194,928	

The four largest steamers named in the above table, built on the seaboard, and the *Santa Cruz*, of 5,081 gross tons, are designed for trade through the Panama Canal, and, of course, it is probable that after the canal is opened some of the smaller vessels will also ply permanently or temporarily on both the Atlantic and Pacific. While large steamers of 5,000 tons or upward will be most economical for continuous trade through the canal, and the bulk of its trade will undoubtedly be conducted by steamship companies maintaining regular schedules, the canal, of course, will offer numerous opportunities for smaller steamers under special charter from time to time. The opening of the Suez Canal, it will be recalled, was followed by a rapid and unbroken decline in the building of sailing vessels, and the opening of the Panama Canal will still further diminish the opportunity for employment of such vessels. The construction of schooners of large tonnage is decreasing and the building of square-rigged vessels ceased several years ago. For historical reasons, the list of American square-rigged vessels still afloat is carried in Appendix J. This appendix, at the current rate of decrease, may soon be accommodated in a single-page statement.

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The following summary of vessels just named in the preceding table and of vessels of over 1,000 gross tons built during the preceding four years shows the changes in the larger form of construction for the five-year period:

COMPARISON OF VESSELS OF 1,000 GROSS TONS AND OVER BUILT, 1909–1913.

Type.	1909		1910		1911		1912		1913	
Seaboard:	*No.*	*Gr. tons.*	*No.*	*Gr. tons.*	*No.*	*Gr. tons.*	*No.*	*Gr. tons.*	*No.*	*Gr. tons.*
Ocean steel steamers	2	6,780	18	78,845	18	76,490	8	22,672	29	105,250
Steel ferryboats, steam dredges, river and bay steamers	6	13,768	2	3,800	8	14,463	....	....	5	10,229
Wooden steamers	1	2,662	1	1,083	3	3,320	1	2,604	3	3,203
Wooden schooners	3	7,544	2	4,766	1	1,352	5	7,581	2	2,414
Steel schooners	....	....	1	1,290	1	1,290	....	....	....	....
Steel unrigged vessels	1	1,288	2	2,401	1	1,133	....	....	....	....
Total	13	32,042	26	92,185	32	98,048	14	32,857	39	121,786
Great Lakes:										
Steel steamers, Lake trade	17	84,428	27	142,521	14	71,276	10	52,667	9	41,582
Steel unrigged vessels	1	1,029	....	....	....	....	2	2,402	1	2,065
Steel steamers, ocean trade	....	....	....	....	....	....	19	23,806	7	17,270
Steel schooner barges, ocean trade	....	....	....	....	....	....	2	4,057	5	12,225
Total	18	85,457	27	142,521	14	71,276	24	82,932	22	73,142
Grand total	31	117,499	53	234,706	46	169,324	38	115,789	61	194,928

CONSTRUCTION DURING THE CURRENT FISCAL YEAR.

The outlook for American shipbuilding on the seaboard during the current fiscal year continues to be promising and the same indications which a year ago pointed to continuous activity are noted. Of course strikes or other special incidents which can not be foreseen may interrupt this activity. During the quarter ended September 30 the new tonnage officially numbered aggregated 90,222 gross tons, compared with 80,281 gross tons for the corresponding period last year, and it is reasonable, therefore, to look for an output during the current 12 months equal to the output of the fiscal year 1912.

The present and recent conditions of the steel shipbuilding industry in the United States are shown by the following table, giving the number and tonnage of steel vessels under construction or contracted for on the dates named:

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COMPARISON OF VESSELS BUILDING, 1900–1913.

Date.	Merchant.				Government.		Total.	
	Lake.		Seaboard.					
	No.	Gr. tons.	No.	Gr. tons.	No.	Tons.[a]	No.	Tons.
Aug. 15, 1900	20	70,119	48	207,561	47	113,329	115	391,009
June 15, 1901	26	81,780	63	273,865	71	281,148	160	636,793
July 1, 1902	39	124,537	65	222,949	67	269,890	171	617,376
July 1, 1903	30	109,020	58	146,655	47	334,147	135	589,822
July 1, 1904	1	400	56	94,588	38	331,435	95	426,423
July 1, 1905	27	104,067	49	86,836	39	308,702	115	499,605
July 1, 1906	33	175,472	78	159,299	29	237,814	140	572,585
July 1, 1907	50	253,949	84	149,524	45	151,993	179	555,466
July 1, 1908	.....	.....	13	14,775	82	136,091	95	150,866
July 1, 1909	13	41,395	52	127,453	52	164,184	117	333,032
July 1, 1910	36	59,692	63	86,075	45	184,096	144	329,863
July 1, 1911	53	71,769	26	28,626	130	119,449	209	219,844
July 1, 1912	51	78,353	80	192,960	85	234,923	216	506,236
July 1, 1913	63	40,849	71	169,580	123	230,603	257	441,032

[a] Displacement.

In accord with the custom of the Bureau for some years past, American builders of steel vessels were requested to make a return showing the steel merchant vessels under contract or under construction at their respective establishments at the beginning of the current fiscal year. The Navy Department, the Revenue-Cutter Service, the Bureau of Lighthouses, and other branches of the Government engaged in operating vessels for public purposes were requested to furnish a similar statement of vessels building or under contract in private yards for their service on that date. The details of these statements are tabulated in Appendix E. The following is a summary:

NUMBER AND TONNAGE OF STEEL MERCHANT AND GOVERNMENT VESSELS UNDER CONSTRUCTION IN AMERICAN SHIPYARDS ON JULY 1, 1913, WITH CAPITAL INVESTED AND MEN EMPLOYED.

	Capital.	Men.	Merchant ships building.		Government vessels building.		Merchant capacity.	
SEACOAST.								
Merchant and Government.								
Newport News Shipbuilding & Dry Dock Co., Newport News, Va.	(a)	5,000	No. 5	Tons. 43,725	No. 7	Tons. [b] 98,080	No. 10	Tons. 50,000
Fore River Shipbuilding Corporation, Quincy, Mass.	(a)	(a)	8	7,313	12	[b] 29,564	(a)	(a)
New York Shipbuilding Co., Camden, N. J.	$6,000,000	5,000	11	23,737	4	[b] 36,812	16	40,000
William Cramp & Sons Ship & Engine Building Co., Philadelphia, Pa.	17,140,575	4,500	5	39,590	19	15,719	(a)	(a)
Seattle Construction & Dry Dock Co., Seattle, Wash.	(a)	1,000	3	1,637	16	[b] 13,500	8	32,000
Craig Shipbuilding Co., Long Beach, Cal.	1,000,000	500	2	2,000	2	(a)	(a)	(a)
Maryland Steel Co., Sparrow Point, Md.	2,000,000	2,000	6	30,600	1	19,132	7	35,000
Staten Island Shipbuilding Co., Port Richmond, N. Y.	(a)	700	4	1,400	1	583	(a)	(a)
T. S. Marvel Shipbuilding Co., Newburgh, N. Y.	(a)	(a)	3	2,200	2	1,380	(a)	(a)
Union Iron Works, San Francisco, Cal.	(a)	1,750	1	(a)	5	(a)	(a)	(a)
Total	[b] 26,140,575	[b] 20,450	48	[b] 152,202	69	[b] 214,770	[b] 41	[b] 157,000

[a] Not reporting. [b] Incomplete.

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NUMBER AND TONNAGE OF STEEL MERCHANT AND GOVERNMENT VESSELS UNDER CONSTRUCTION IN AMERICAN SHIPYARDS ON JULY 1, 1913, WITH CAPITAL INVESTED AND MEN EMPLOYED—Continued.

	Capital.	Men.	Merchant ships building.		Government vessels building.		Merchant capacity.	
SEACOAST—continued.								
Merchant only.			*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
John H. Dialogue & Son, Camden, N. J.	(a)	500	5	1,780	....	.....	(a)	(a)
Skinner Shipbuilding & Dry Dock Co., Baltimore, Md	(a)	300	2	500	....	.....	(a)	(a)
Pusey & Jones Co., Wilmington, Del	(a)	(a)	1	456	....	.....	(a)	(a)
Merrill Stevens Co., Jacksonville, Fla	$600,000	450	1	800	....	.....	4	2,500
Harlan & Hollingsworth Corporation, Wilmington, Del	1,750,000	1,800	5	11,093	....	.....	15	15,000
Clinton Shipbuilding Co., Philadelphia, Pa	(a)	35	2	b 574	....	.....	(a)	(a)
Spedden Shipbuilding Co., Baltimore, Md	(a)	100	1	200	....	.....	3	(a)
Ellicott Machine Corporation, Baltimore, Md	(a)	150	4	1,350	....	.....	4	10,000
Johnson Iron Works, New Orleans, La.	100,000	150	1	625	....	.....	(a)	(a)
Downey Shipyard & Marine Co., Brooklyn, N. Y	(a)	60	1	(a)	....	.....	(a)	(a)
Total	b 2,450,000	b 3,545	23	b 17,378	....	.....	b26	b 27,500
Government only.								
Bath Iron Works, Bath, Me	1,000,000	1,000	....	.....	3	3,060	3	5,000
Lake Torpedo Boat Co., Bridgeport, Conn	2,000,000	250	....	.....	2	(a)	6	1,000
New London Ship & Engine Co., Groton, Conn	(a)	(a)	....	.....	1	1,408	(a)	(a)
Portland Iron Works, Portland, Oreg	(a)	(a)	....	.....	2	1,600	(a)	(a)
Total	b 3,000,000	b 1,250	....	.....	8	b 6,068	b 9	b 6,000
GREAT LAKES AND WESTERN RIVERS.								
Des Moines Bridge & Iron Works, Pittsburgh, Pa	150,000	50	5	450	1	50	12	(a)
American Bridge Co., Pittsburgh, Pa	(a)	(a)	40	10,742	12	1,830	120	30,000
Toledo Shipbuilding Co., Toledo, Ohio	2,000,000	800	1	250	....	.....	3	18,000
American Shipbuilding Co.:								
Cleveland, Ohio	(a)	2,100	3	3,742	....	.....	3	18,800
Lorain, Ohio	(a)	1,700	2	14,900	....	.....	11	50,000
Great Lakes Engineering Works, Ecorse, Mich	1,500,000	800	3	7,950	....	.....	7	30,000
Manitowoc Shipbuilding & Dry Dock Co., Manitowoc, Wis	700,000	400	4	1,950	....	.....	6	5,000
James Rees & Sons Co., Pittsburgh, Pa.	500,000	125	c3	675	....	.....	10	2,000
Great Lakes Towing Co., Cleveland, Ohio	150,000	90	2	190	....	.....	8	720
M. A. Sweeney Shipyard & Foundry Co., Jeffersonville, Ind	(a)	(a)	....	.....	2	550	(a)	(a)
Howard Ship Yards Co., Jeffersonville, Ind	(a)	(a)	....	.....	4	1,090	(a)	(a)
Marion Steam Shovel Co., Marion, Ohio.	(a)	(a)	....	.....	1	500	(a)	(a)
Dubuque Boat & Boiler Works, Dubuque, Iowa	100,000	125	....	.....	10	2,480	(a)	(a)
Chas. Hegewald Co., New Albany, Ind.	(a)	(a)	....	.....	2	175	(a)	(a)
Racine-Truscott-Shell Lake Boat Co., Muskegon, Mich	(a)	(a)	....	.....	2	520	(a)	(a)
Rock Island Bridge & Iron Works, Rock Island, Ill	50,000	75	....	.....	2	1,200	3	1,500
Hartmann-Greiling Co., Green Bay, Wis	(a)	(a)	....	.....	9	1,240	(a)	(a)
Charles Ward Engineering Co., Charleston, W. Va	(a)	(a)	....	.....	1	200	(a)	(a)
Total	b 5,150,000	b 6,265	63	40,849	46	9,835	b183	b 156,020

a Not reporting. b Incomplete. c Two for Colombia.

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NUMBER AND TONNAGE OF STEEL MERCHANT AND GOVERNMENT VESSELS UNDER CONSTRUCTION IN AMERICAN SHIPYARDS ON JULY 1, 1913, WITH CAPITAL INVESTED AND MEN EMPLOYED—Continued.

	Capital.	Men.	Merchant ships building.		Government vessels building.		Merchant capacity.	
REPORTING NO VESSELS UNDER CONSTRUCTION.			*No.*	*Tons.*	*No.*	*Tons*	*No.*	*Tons.*
The Atlantic Works, Boston, Mass.	(a)	(a)	....	....	....	....	(a)	(a)
Quintard Iron Works Co., New York, N. Y.	(a)	(a)	....	....	....	....	(a)	(a)
Arthur Sewall & Co., Bath, Me.	(a)	(a)	....	....	....	....	(a)	(a)
Riverside Iron Works, Charleston, S. C.	(a)	(a)	....	....	....	....	(a)	(a)
Superior Shipbuilding Co., Superior, Wis.	(a)	150	....	....	....	....	4	40,000
Johnston Bros., Ferrysburg, Mich.	(a)	(a)	....	....	....	....	(a)	(a)
Chicago Shipbuilding Co., Chicago, Ill.	(a)	(a)	....	....	....	....	(a)	(a)
Willamette Iron & Steel Works, Portland, Oreg.	(a)	(a)	....	....	....	....	(a)	(a)
Great Lakes Engineering Works, Ashtabula, Ohio.	$900,000	400	....	....	....	....	3	12,000
Milwaukee Bridge Co., Milwaukee, Wis.	(a)	(a)	....	....	....	....	(a)	(a)
Charles Barnes Co., Cincinnati, Ohio.	(a)	(a)	....	....	....	....	(a)	(a)
Buffalo Dry Dock Co., Buffalo, N. Y.	(a)	400	....	....	....	....	5	4,000
Detroit Shipbuilding Co., Detroit, Mich	2,000,000	2,000	....	....	....	....	5	35,000
Total	b 2,900,000	b 2,950	....	....	....	....	b 17	b 91,000
SUMMARY.								
Seacoast:								
Merchant and Government	26,140,575	20,450	48	152,202	69	214,770	41	157,000
Merchant only	2,450,000	3,545	23	17,378	....	....	26	27,500
Government only	3,000,000	1,250	....	....	8	6,068	9	6,000
Great Lakes and western rivers	5,150,000	6,265	63	40,849	46	9,835	183	156,020
No construction	2,900,000	2,950	....	....	....	....	17	91,000
Total	b 39,640,575	b 34,460	134	b 210,429	123	b 230,673	b 276	b 437,520

a Not reporting. b Incomplete.

Besides the Navy vessels included in the table above, the battleships *New York*, 27,000 tons displacement, and *No. 39*, 31,400 tons displacement, of 21 knots speed, are being built at the navy yard at New York. Two fuel ships each having 14,500 tons displacement and two gunboats each having 190 tons displacement are being built at Mare Island, Cal.

The following table shows the ocean steamers of 1,000 gross tons or over built in the United States during the past 10 years, according to the trade for which they were originally designed:

TRADES OF OCEAN STEAMERS OF OVER 1,000 GROSS TONS BUILT, 1904–1913.

Year.	Foreign.								Coasting.				Total.	
	Trans-Atlantic.		Trans-Pacific (direct).		Trans-Pacific (via Hawaii).		West Indies, Mexico, Venezuela.		Hawaii.		Other.			
	No.	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*	*No.*	*Tons.*
1904	1	7,914	1	20,714	2	27,276	....	....	....	....	3	15,407	7	71,311
1905	....	....	1	20,714	....	....	....	....	....	....	6	20,856	7	41,570
1906	....	....	....	....	....	....	2	12,414	....	....	1	2,930	3	15,344
1907	....	....	....	....	....	....	2	12,782	1	8,579	19	66,251	22	87,612
1908	....	....	....	....	....	....	....	....	4	21,477	21	80,181	25	101,658
1909	....	....	....	....	....	....	....	....	....	....	2	6,780	2	6,780
1910	....	....	....	....	....	....	1	3,803	2	13,580	15	61,462	18	78,845
1911	....	....	....	....	....	....	3	10,837	2	13,665	13	51,988	18	76,490
1912	....	....	....	....	....	....	2	6,203	....	....	16	40,275	18	46,478
1913	1	5,225	....	....	....	....	4	26,610	....	....	34	93,978	39	125,813
Total	2	13,139	2	41,428	2	27,276	14	72,649	9	57,301	130	440,108	159	651,901

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RECOMMENDATIONS.

The act of July 5, 1884, makes it the statutory duty of the Commissioner of Navigation to "investigate the operation of the laws relative to navigation, and annually report to the Secretary of Commerce such particulars as may, in his judgment, admit of improvement or may require amendment." On later pages various changes in the laws are suggested but it has seemed best to keep these suggestions within narrow limits, in view of the large number of important propositions relating to navigation which will necessarily be brought to the attention of Congress at the coming session. Nearly all of these propositions involve the cooperation of maritime nations generally in the establishment of standards to promote safety at sea or to promote intercourse with foreign nations. The extent of the program which events are now shaping for congressional consideration is not perhaps realized.

On November 12 the principal maritime nations will assemble at London by invitation of the British Government and in part on the initiative of our own Congress to consider matters relating to safety of life at sea. In the autumn of 1914 another international conference will assemble at London to endeavor to secure uniform load lines for merchant vessels. A little later in the year another international conference will resume its efforts at Brussels to secure the unification of maritime law in respect of the limitation of the liability of shipowners.

The House Committee on the Merchant Marine and Fisheries of the last Congress made thorough investigation into shipping combinations, and the report of that committee with its recommendations in the form of legislation will doubtless require action.

The early adjustment of our measurement laws to the situation created by the opening of the Panama Canal is mentioned on another page.

For all of these purposes Congress has made considerable appropriations, and on all of them careful work in preparation has been expended.

The provisional program for the London International Maritime Conference on Safety at Sea alone provides for the consideration of the following questions:

1. The desirability of establishing standards of efficiency as to the construction and inspection of passenger steamers and emigrant ships as regards hull, equipment, and machinery. The regulations of the United States, France, Germany, and Great Britain with regard to these matters, and the conditions under which passenger steamers are surveyed and certificates issued, already approximate to a uniform standard.

2. Regulations as to the division of ocean-going passenger steamers into water-tight compartments, so as to insure that they will float indefinitely, or for a considerable time at least after collision or stranding; and the desirability of standards being laid down for bulkheads and watertight compartments to secure this object. Whether and to what extent compliance with Government regulations as to bulkheads and water-tight compartments should be compulsory.

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3. What lifeboats and other boats (rafts and other buoyant apparatus) should be carried on an ocean-going steamer for the purpose of saving life. The number of kinds of lifeboats and other boats, rafts, etc., which should be provided, and what appliances and arrangements for lowering them should be required. What surveys should be made of boats and appliances for lowering them, during construction and after construction, i. e., at the commencement of each voyage or annually.

4. What number of competent men should be regarded as the minimum to be required for the purpose of manning a ship's lifeboat, and what test of competency should be laid down for such men. Whether able seamen only or seamen of other ratings of a ship's company in addition should be regarded as eligible to man boats if they prove their competence. What arrangements should be made with regard to the proper organization of a crew for lowering boats and maintaining discipline, and also for marshaling passengers to the boats.

5. Whether the existing arrangements for reporting ice, derelicts, or other sunken or floating dangers to navigation and for warning ships of such dangers could be improved by means of any action taken by the admiralty or navy departments or the hydrographical or meteorological departments of the principal maritime countries or by any other method. Whether arrangements could be made for (*a*) the destruction of derelicts and other dangers to navigation, or (*b*) warning steamship companies as to the movement of ice in the north Atlantic Ocean by individual governments or by international action.

6. What classes of (*a*) passenger steamers and (*b*) other vessels should be compelled by law to be provided with a wireless-telegraph installation. What should be the minimum range of the installations and what should be the minimum requirements as regards the operating staff. (Recommendations on this subject have been made by the International Radiotelegraphic Conference and these might be considered by the International Conference on Safety at Sea in detail, so far as ocean-going passenger steamers are concerned.)

7. Question of the amendment of the International Regulations for the Prevention of Collisions at Sea:

(*a*) ART. 16. (Whether there should be an amendment of this article so as to require every vessel to go at a moderate speed when warned of the presence of icebergs, field ice, or ice in other forms, in or near the course she is following.)

(*b*) ART. 31. (Whether there should be an amendment of this article so as to make it an obligation to answer distress signals exhibited at sea and to go to the relief of any vessel exhibiting them.) There is a clause (Art. 11) in the international convention with regard to salvage bearing on this question. Section 6 of the maritime conventions act, 1911, gives effect to it in this country.

(*c*) Whether the governments of the principal maritime countries should prohibit any private signals (i. e., any of the signals exhibited by individual steamship lines) which can be confused with the distress signals contained in article 31 of the International Regulations for the Prevention of Collisions at Sea.

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8. Whether ocean steamship routes, either in the north Atlantic Ocean or elsewhere, should be agreed to and enforced by the governments of the principal maritime countries or left to steamship companies to agree to, follow, and modify when necessary.

In addition to the subjects included in the provisional program at the suggestion of the United States it has been specifically agreed that the subjects of prevention of fire and protection against fire and of the efficiency of officers and crews shall also be considered at the conference.

REMISSION OR MITIGATION OF FINES, PENALTIES, AND FORFEITURES.

The following table shows the number of applications for the mitigation or remission of penalties incurred for violation of the navigation laws, reported by collectors or surveyors of customs, and acted upon by the Secretary of Commerce during the past year, with a summary statement for the last 10 years:

Port.	Total.	Steamboat laws (4399–4500, R. S.).	Motor-boat law, "Rules of road."	Surrendered license (4325–4326, R. S.).	Bills of health (Feb. 15, 1893).[a]	Anchorage and St. Marys River rules.	Passenger act (Aug. 2, 1882).	Enrollment and license (4336, R. S.).	Entry and clearance (4197, 2774, R. S.).	Name on vessel (4178, R. S.).	Change of master (4335, R. S.).	Unlading.	Radio-communication laws.	Miscellaneous.
Alexandria, Va.	6	.....	5	....	....	....	....	....	....	1	....	....	....	....
Apalachicola, Fla.	4	.....	4	....	....	....	....	....	....	....	....	....	....	....
Astoria, Oreg.	86	1	83	....	....	....	....	....	....	....	....	1	1	....
Baltimore, Md.	235	13	205	1	....	....	....	....	....	10	5	....	....	1
Bangor, Me.	3	.....	3	....	....	....	....	....	....	....	....	....	....	....
Barnstable, Mass.	6	.....	3	....	....	....	....	3	....	....	....	....	....	....
Beaufort, S. C.	2	.....	2	....	....	....	....	....	....	....	....	....	....	....
Boston, Mass.	25	3	11	....	....	....	2	....	....	....	....	....	7	2
Brashear, La.	6	2	2	....	....	....	....	....	....	1	....	....	....	1
Bridgeport, Conn.	8	.....	7	....	....	....	....	....	....	....	....	....	....	1
Bridgeton, N. J.	6	.....	6	....	....	....	....	....	....	....	....	....	....	....
Brunswick, Ga.	3	3	....	....	....	....	....	....	....	....	....	....	....	....
Buffalo, N. Y.	52	5	40	....	....	2	....	....	....	....	....	....	....	5
Burlington, N. J.	7	.....	7	....	....	....	....	....	....	....	....	....	....	....
Cape Charles, Va.	15	.....	12	....	....	....	....	....	....	3	....	....	....	....
Cape Vincent, N. Y.	15	.....	14	....	....	....	....	1	....	....	....	....	....	....
Castine, Me.	1	.....	1	....	....	....	....	....	....	....	....	....	....	....
Cedar Keys, Fla.	4	.....	4	....	....	....	....	....	....	....	....	....	....	....
Charleston, S. C.	10	1	5	....	....	....	....	....	....	....	2	....	....	2
Chattanooga, Tenn.	2	2	....	....	....	....	....	....	....	....	....	....	....	....
Chicago, Ill.	22	5	14	....	....	1	....	....	....	....	....	....	....	2
Cincinnati, Ohio.	8	1	7	....	....	....	....	....	....	....	....	....	....	....
Cleveland, Ohio.	34	7	17	....	....	1	....	3	1	....	1	....	....	4
Coos Bay, Oreg.	50	.....	50	....	....	....	....	....	....	....	....	....	....	....
Corpus Christi, Tex.	5	1	4	....	....	....	....	....	....	....	....	....	....	....
Crisfield, Md.	31	.....	21	....	....	....	....	....	....	8	2	....	....	....
Detroit, Mich.	64	5	55	....	....	....	....	1	....	....	....	....	....	3
Duluth, Minn.	15	6	5	1	....	2	....	....	....	....	1	....	....	....
Eagle Pass, Tex.	28	.....	26	2	....	....	....	....	....	....	....	....	....	....
Eastport, Me.	5	.....	4	1	....	....	....	....	....	....	....	....	....	....
Edgartown, Mass.	1	.....	1	....	....	....	....	....	....	....	....	....	....	....
Elizabeth City, N. C.	256	2	246	....	....	....	....	....	....	8	....	....	....	....
Ellsworth, Me.	1	.....	....	....	....	....	....	....	....	1	....	....	....	....
Erie, Pa.	15	.....	15	....	....	....	....	....	....	....	....	....	....	....
Evansville, Ind.	5	3	2	....	....	....	....	....	....	....	....	....	....	....
Fall River, Mass.	1	.....	1	....	....	....	....	....	....	....	....	....	....	....
Fernandina, Fla.	2	.....	....	....	....	....	....	2	....	....	....	....	....	....
Galveston, Tex.	15	9	....	....	....	....	....	....	....	....	....	....	....	6
Georgetown, S. C.	1	1	....	....	....	....	....	....	....	....	....	....	....	....
Gloucester, Mass.	13	1	12	....	....	....	....	....	....	....	....	....	....	....
Grand Haven, Mich.	88	4	79	1	....	....	....	....	....	1	1	....	....	2
Gulfport, Miss.	13	1	8	....	....	....	....	....	....	2	1	....	....	1
Hartford, Conn.	14	.....	14	....	....	....	....	....	....	....	....	....	....	....
Honolulu, Hawaii.	11	.....	4	....	....	....	....	....	....	....	....	....	1	6
Houston, Tex.	24	.....	24	....	....	....	....	....	....	....	....	....	....	....

[a] Bills of health cases transferred to Treasury Department, July 24, 1911.

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Port.	Total.	Steamboat laws (4399–4500, R. S.).	Motor-boat law, "Rules of road."	Surrendered license (4325–4328, R. S.).	Bills of health (Feb. 15, 1893).	Anchorage and St. Marys River rules.	Passenger act (Aug. 2, 1882).	Enrollment and license (4336, R. S.).	Entry and clearance (4197, 2774, R. S.).	Name on vessel (4178, R. S.).	Change of master (4335, R. S.).	Unlading.	Radio-communication laws.	Miscellaneous.
Jacksonville, Fla.	164	1	149	3	.....	.....	.....	2	.....	1	4	.....	.....	4
Juneau, Alaska	27	6	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
Kansas City, Mo.	16	1	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Key West, Fla.	22	.....	17	1	.....	.....	.....	2	.....	.....	.....	.....	.....	2
Los Angeles, Cal.	17	.....	13	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	3
Louisville, Ky.	6	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Marblehead, Mass.	3	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Marquette, Mich.	30	2	23	.....	.....	2	.....	1	.....	.....	.....	.....	.....	2
Memphis, Tenn.	6	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milwaukee, Wis.	16	2	11	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	2
Mobile, Ala.	17	3	10	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....
Nashville, Tenn.	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Bedford, Mass.	2	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newbern, N. C.	92	.....	81	.....	.....	.....	.....	.....	.....	10	.....	.....	.....	1
New London, Conn.	8	5	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
New Orleans, La.	67	2	53	.....	.....	.....	.....	.....	5	1	.....	.....	5	1
Newport, R. I.	3	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newport, Oreg.	29	.....	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newport, Vt.	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newport News, Va.	179	20	144	.....	.....	.....	.....	.....	.....	7	.....	.....	7	1
New York, N. Y.	283	93	143	8	.....	14	5	3	.....	1	.....	.....	8	8
Niagara Falls, N. Y.	12	.....	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk, Va.	112	5	104	.....	.....	.....	.....	.....	.....	1	1	.....	.....	1
Ogdensburg, N. Y.	5	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Oswego, N. Y.	14	2	12	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Patchogue, N. Y.	8	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pembina, N. Dak.	8	.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pensacola, Fla.	6	1	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Peoria, Ill.	13	.....	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Perth Amboy, N. J.	39	1	37	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Petersburg, Va.	69	.....	69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Philadelphia, Pa.	140	61	71	.....	.....	.....	.....	.....	.....	.....	.....	.....	3	5
Pittsburgh, Pa.	5	3	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Arthur, Tex.	10	3	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	4
Port Huron, Mich.	39	5	27	.....	.....	1	.....	1	.....	.....	.....	.....	.....	5
Portland, Me.	18	1	13	1	.....	.....	.....	.....	.....	.....	1	.....	.....	2
Portland, Oreg.	165	2	156	1	.....	.....	.....	.....	.....	4	.....	.....	.....	2
Port Townsend, Wash.	59	6	22	.....	.....	.....	.....	1	1	3	2	.....	4	20
Providence, R. I.	17	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Richmond, Va.	51	.....	51	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rochester, N. Y.	28	.....	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rockland, Me.	5	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Salem, Mass.	7	1	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Diego, Cal.	6	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Sandusky, Ohio.	4	.....	1	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	1
San Francisco, Cal.	107	9	73	.....	.....	.....	.....	1	1	4	2	.....	3	14
San Juan, P. R.	18	.....	6	.....	.....	.....	1	.....	.....	3	.....	.....	1	7
Savannah, Ga.	3	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
St. Augustine, Fla.	41	.....	41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Joseph, Mo.	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	3	1	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springfield, Mass.	9	.....	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tampa, Fla.	121	4	103	1	.....	.....	.....	.....	.....	4	1	.....	.....	8
Tappahannock, Va.	63	5	53	.....	.....	.....	.....	.....	.....	2	1	.....	.....	2
Toledo, Ohio.	15	3	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Waldoboro, Me.	4	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington, D. C.	22	.....	22	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wheeling, W. Va.	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wilmington, Del.	11	1	9	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Wilmington, N. C.	25	1	19	1	.....	.....	.....	1	.....	.....	1	.....	.....	2
Wiscasset, Me.	14	1	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yaquina, Oreg.	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total—														
1913 (107 ports)	3,506	333	2,783	23	.....	23	8	24	10	83	26	1	40	152
1912 (105 ports)	3,634	165	3,119	96	3	12	17	38	39	81	12	.....	.....	52
1911 (92 ports)	2,268	182	1,811	23	41	17	45	10	16	43	30	.....	.....	50
1910 (74 ports)	1,070	252	488	17	52	13	61	13	16	68	12	2	.....	76
1909 (64 ports)	1,134	151	710	33	69	3	21	14	7	59	.....	4	.....	63
1908 (73 ports)	852	245	385	12	42	6	21	23	18	30	7	2	.....	61
1907 (66 ports)	684	209	92	88	36	18	62	9	23	52	27	5	.....	63
1906 (77 ports)	670	194	130	114	41	13	27	10	6	49	5	9	.....	72
1905 (63 ports)	524	142	53	99	42	13	21	26	7	20	11	28	.....	62
1904 (66 ports)	706	184	93	101	48	49	16	29	12	24	19	(a)	.....	131

a Included under "Miscellaneous" in 1904 report.

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These violations fall into two general classes: Those which may be ascertained ashore and those which may be ascertained and reported only while a vessel is actually under way. The former class includes violations of laws concerning marine papers, such as lapse of certificates of inspection, improper licenses, and failure to carry documents required by law; the second class includes offenses against the law committed upon the water, such as violations of the rules to prevent collisions and failure to carry the varied equipment which Congress has prescribed for the safety of life. The latter class evidently is the more serious in its nature and consequences and of late years the efforts of this Bureau and other officers concerned have been directed particularly to such offenses. The increased number of violations of law reported to the Department within recent years does not therefore represent an increased disregard of the law but is evidence rather of a more vigilant and systematic enforcement of the law throughout the United States. This increasing number of offenses is due also to the greater regard which Congress in its legislation has shown for the safety of human life afloat by the enactment of new laws of which the acts of 1910 and 1912 concerning apparatus and operators for radio communication and the motor-boat law are the most widely known examples. Since June 25, 1910, Congress has appropriated annually $15,000 for the enforcement on the water of some of these laws, and the results may be traced in the foregoing table. Last year, it will be recalled, the legislative, executive, and judicial appropriation bill carrying this item was not finally approved until August 23 and in consequence, during the two summer months collectors of customs were without resources for the performance of these statutory duties.

Two widely different lines of public duty are assigned by law to collectors of customs. These officers draw their title from their duty under the Secretary of the Treasury to value and collect tariff duties upon importations. From the beginning of government the enforcement of the navigation laws also has been intrusted to collectors of customs. The original registry act of September 1, 1789, bestowed upon these officers powers which they still exercise. The steamboat-inspection laws of nearly half a century ago made it the duty of collectors of customs to enforce those statutes in the case of all steamers arriving and departing. As Congress of late years has steadily extended the scope of legislation in the interests especially of the safety of human life and incidentally of property upon the water, the duties of collectors of customs have been correspondingly increased. At their respective ports they see to it that the provisions of the passenger act of 1882, relating to steerage passengers, are complied with. They enforce, so far as nontechnical provisions are concerned, the acts requiring wireless apparatus on ships and regulating radio communication, and the duty of enforcing the motor-boat law is theirs. Besides these laws of general application, their duties in respect to navigation are further extended by various minor statutes. While collectors of customs are thus the general administrative field force of the Department of Commerce in the administration of the navigation and inspection laws, the Department has also its specific agencies for specific purposes, as the steamboat-inspection force, the radio-inspection force, the shipping commissioners, and the inspection force connected with the motor boat *Tarragon*. Outside of the

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Department the Revenue-Cutter Service lends its assistance in various directions, and the success which has attended the administration of the laws concerning radio communication has been due in great measure to the cordial cooperation of the War and Navy Departments.

The number of collectors who have actively interested themselves in the past year in navigation work, as shown by the foregoing table, was 107, the largest number since this phase of the duties of collectors of customs was brought intimately to their attention. The Executive order which took effect July 1, 1913, has materially changed the organization of customs districts and with the cordial cooperation of the Treasury Department, even greater efficiency hereafter in the administration of the laws under consideration is assured. In many of the inland districts not included in the above table, such as Denver, Colo., El Paso, Tex., and Atlanta, Ga., of course, collectors of customs have no navigation work to perform.

The following table shows the number of applications for the remission or mitigation of penalties forwarded by collectors of customs during each of the past 10 years, and with certain limitations is a measure of the activity of those officers:

COMPARATIVE STATEMENT OF CASES OF VIOLATION OF THE NAVIGATION AND STEAMBOAT-INSPECTION LAWS REPORTED BY OFFICERS OF CUSTOMS, 1904–1913.

Port.	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	Total.
Albany	3	1	3	1				7	2		17
Alexandria	3				2			2		6	13
Annapolis	9	3		4	1		2	8			27
Apalachicola	3		2		1	1	4		1	4	16
Astoria	7	6	9	5	1	1		2	8	86	125
Baltimore	47	18	12	26	16	26	12	73	31	235	496
Bangor	4	3							10	3	20
Barnstable			6	3			3	1	46	6	65
Bath					8			2	10		20
Beaufort, N. C	3	1	5		8			9	3		29
Beaufort, S. C			3	2	2	2	3	1	2	2	17
Belfast	1										1
Boston	24	28	23	7	7	11	26	76	36	25	263
Brashear			13				3		16	6	38
Bridgeport				5	2	1	1	92	363	8	472
Bridgeton, N. J										6	6
Bristol, R. I									6		6
Brunswick	3	1	1		4	2	1	2	2	3	19
Buffalo	1	3	3	5	9	8	30	9	70	52	190
Burlington, Iowa			2	3		2			3		10
Burlington, N. J										7	7
Burlington, Vt						2			4		6
Cairo, Ill			1		1		1				3
Cape Charles	7	1			3		1	7	32	15	66
Cape Vincent			2		4	5	2	10	20	15	58
Castine							1	22	37	1	61
Cedar Keys	1		2							4	7
Charleston	2		2	19	1		1		2	10	37
Chattanooga		1	1	1	1			4		2	10
Chicago	8	7	8	7	21	5	70	96	55	22	299
Cincinnati					2	1	1	30	16	8	58
Cleveland	14	2	9	10	4	8	26	69	31	34	207
Coos Bay, Oreg									1	50	51
Corpus Christi	1							1	16	5	23
Crisfield	5	9	1	4		13	27	12	82	31	184
Detroit	3	3	18	28	5	42	55	33	107	64	358
Dubuque	1				1						2
Duluth	34	16	15	16	15	14	46	9	13	15	193
Dunkirk, N. Y									2		2
Eagle Pass								1	3	28	32
Eastport			1		3	9	8	10	9	5	45
Edgartown	1			1		1			11	1	15
Elizabeth City		2		1		11	5	8	1	256	284
Ellsworth		1					2	20	38	1	62
Erie			2	1			4	4	8	15	34
Eureka		2		1					7		10
Evansville					2			7	23	5	37
Fall River	2	1	5			4	1	18	36	1	68

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COMPARATIVE STATEMENT OF CASES OF VIOLATION OF THE NAVIGATION AND STEAMBOAT-INSPECTION LAWS REPORTED BY OFFICERS OF CUSTOMS, 1904–1913 – Continued.

Port.	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	Total.
Fernandina	5	8	7	16	3				2	2	43
Galveston	7	5	8	15	5	9	1	6	2	15	73
Georgetown, S. C.										1	1
Gloucester		3	3	3				25	19	13	66
Grand Haven	3	7	10	9	9	24	19	16	64	88	249
Great Falls			1								1
Greenport					1						1
Gulfport	15	20	19	11	2	2	24	4	26	13	136
Hartford	1	3	3		3		1	53	26	14	104
Honolulu	6	2	8		7	17	20	14	14	11	99
Houston, Tex										24	24
Jacksonville	3	4	2	5	3	11	15	97	194	164	498
Juneau	18	21	10	22	9	8	17	113	67	27	312
Kansas City							1	2	7	16	26
Key West	11	13	26	12	5	4	24	28	171	22	316
Los Angeles		8	5	4	52	4	25	50	26	17	191
Louisville				2				11	19	6	38
Machias				1							1
Marblehead								8	47	3	58
Marquette	16	6	5	6	10	13	79	7	55	30	227
Memphis	3	1	4	3	3	3	1	6	12	6	42
Milwaukee	2	6	9	4	14	19	13	16	22	16	121
Mobile	6	15	13	12	4	7	17	32	14	17	137
Nashville		1	2				2			1	6
Natchez						4					4
Newark	4		1	2	2		3	10	11		33
New Bedford						2	4	1	16	2	25
Newbern	1								8	92	101
Newburyport		1			1						2
New Haven	4	1	6	3	2	1	2	40	28		87
New London	3	2	2	1	2	2	9	16	5	8	50
New Orleans	11	15	25	21	21	12	21	51	55	67	299
Newport, Oreg										29	29
Newport, R. I		1	3		3	2	5	4	12	3	33
Newport, Vt										1	1
Newport News	9	7	14	9	145	28	21	20	32	179	464
New York	142	126	144	118	247	635	171	142	265	283	2,273
Niagara Falls					1		2		3	12	18
Norfolk	26	5	6	7	22	37	21	54	25	112	315
Ogdensburg	5	4		3		1	1	3	4	5	26
Oswego			4			1	5	2	4	14	30
Paducah		1	2	3			1	3	5		15
Patchogue	2									8	10
Pembina, N. Dak										8	8
Pensacola	2	7	5	1	4	1		2	5	6	33
Peoria								41		13	54
Perth Amboy	12	5	12	3		3		133	74	39	281
Petersburg, Va										69	69
Philadelphia	24	11	23	15	10	8	15	4	23	140	273
Pittsburgh									24	5	29
Plattsburg				1			3		1		5
Plymouth			1								1
Port Arthur				6	4	3	5	28	35	10	91
Port Huron	11	7	8	5	4	7	8	13	25	39	127
Portland, Me	1	4	1	3	1	3	5	2	9	18	47
Portland, Oreg		1	2		1	2	6	5	116	165	298
Portsmouth							1	6	7		14
Port Townsend	138	54	72	87	33	29	19	74	108	59	673
Providence	1	1	11	9	6	11	2	75	52	17	185
Richmond						1		13	3	51	68
Rochester				1	2		2	16	19	28	68
Rock Island, Ill								1			1
Rockland, Me									1	5	6
Sag Harbor	1										1
St. Augustine	1				1				98	41	141
St. Joseph, Mo										1	1
St. Louis					2	3	6	28	81	3	123
St. Marys, Ga			1		9						10
St. Paul	1	1	1			2		3			8
Salem			2	1					95	7	105
San Diego				1			1	15	10	6	33
Sandusky		11	9	7	6	1	1	3	6	4	48
San Francisco	6	18	11	72	25	20	70	103	57	107	489
San Juan	11	4	4	3	13	3	9	9	25	18	99
Savannah	2		6	1	2				5	3	19
Sioux City					4	2					6
Somers Point	1		1	1				1	1		5
Springfield, Mass								3	21	9	33
Stonington		1	1					5	1		8

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COMPARATIVE STATEMENT OF CASES OF VIOLATION OF THE NAVIGATION AND STEAMBOAT-INSPECTION LAWS REPORTED BY OFFICERS OF CUSTOMS, 1904-1913—Continued.

Port.	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	Total.
Tampa	1	1	1	20	3	10	37	8	211	121	413
Tappahannock	1	.....	1	.....	.....	.....	.....	120	29	63	214
Toledo	.....	1	.....	2	15	.....	.....	8	5	15	46
Waldoboro	1	.....	2	3	1	1	6	16	6	4	40
Washington	1	.....	1	.....	2	4	8	19	16	22	73
Wheeling	.....	.....	.....	.....	3	5	.....	1	.....	1	10
Wilmington, Del	.....	1	2	.....	.....	.....	2	20	4	11	40
Wilmington, N. C	.....	.....	.....	.....	.....	.....	.....	6	8	25	39
Wiscasset	.....	1	1	.....	1	.....	3	8	30	14	58
Yaquina, Oreg	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Total (137 ports)	706	524	670	684	852	1,134	1,070	2,268	3,634	3,506	15,048

MOTOR BOAT "TARRAGON."

The special circumstances and needs which led to the purchase of the motor boat *Tarragon* on June 24, 1912, were mentioned in last year's report. The results of a full year's experiment are now available. The vessel was under way 225 days during the fiscal year and during this period traversed 6,503 miles, a daily running average of a little less than 30 miles. Her inspection work was carried on in the customs districts of Perth Amboy, Bridgeton, and Burlington, N. J.; Philadelphia, Pa.; Baltimore, Annapolis, and Crisfield, Md.; Norfolk, Newport News, Cape Charles, Tappahannock, Richmond, Petersburg, and Alexandria, Va.; Washington, D. C.; Elizabeth City, Newbern, Beaufort, and Wilmington, N. C. In December and January she was out of commission 55 days for the construction of a pilot house and other changes to adapt her for winter work, and 37 days in May and June for overhauling engines and machinery. In these customs districts several thousand smaller vessels were inspected (mainly motor boats) and in the case of 902 vessels one or more violations of law were reported. In 433 cases vessels were found without life preservers prescribed by statute and in 372 cases without the means for extinguishing burning gasoline. During night patrol the officers of the *Tarragon* reported 191 vessels without running lights or anchor lights prescribed. In 390 cases the vessels were without the course-indicating appliances, such as whistle or bell. The aggregate of the statutory penalties involved in these infractions of law was $279,190. The Department, however, has imposed penalties for exemplary and not punitive purposes, and accordingly the penalties have already been mitigated or remitted or in cases yet to be considered will probably be remitted or mitigated to approximately $5,500.

The success of the venture has been due in a very large part to the tact and good judgment of the officers in charge of the *Tarragon* and to the understanding and appreciation of their efforts by motorboat clubs and prudent owners who realize the importance of complying with carefully matured laws and regulations to promote safe navigation. In many places visited by the Government inspection boat apparently little heed had been paid heretofore to the acts of Congress, and in very many instances men were ignorant of their requirements. While to an extent customs officers are responsible for this situation, as thousands of copies of the statutes had been

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sent to them in circular form for distribution, at the same time it would not be just to criticize these officers, as in many instances they have had no means at hand to enforce compliance with the laws upon the water. These considerations have had weight with the Department in reducing the penalties to the minimum, in the belief that the first offenses in most instances should be either punished by a slight fine or wholly condoned. In the 19 customs districts visited by the *Tarragon* the owners of vessels have now had fair warning and repetition of offenses should entail heavier penalties.

The following table shows the total expenditures in connection with this vessel from the date of purchase on June 24, 1912, to the end of the fiscal year June 30, 1913.

EXPENDITURES FOR THE MOTOR BOAT "TARRAGON."

	1912	1913	Total.
Plant:			
First cost	$4,500.00		$4,500.00
New construction		$1,553.68	1,553.68
Instruments and other equipment	368.90	355.24	724.14
Furniture	77.55	226.63	304.18
Repairs	297.94	1,506.92	1,804.86
Total	5,244.39	3,642.47	8,886.86
Personnel:			
Salaries	25.67	2,992.85	3,018.52
Provisions and household supplies	133.96	591.22	725.18
Cleaning, etc		11.78	11.78
Laundry		93.32	93.32
Shore transportation, subsistence, and expenses	84.87	222.63	307.50
Telegrams and telephones	1.41	24.30	25.71
Fuel, galley, and heat		42.67	42.67
Total	245.91	3,978.77	4,224.68
Navigation:			
Gasoline	250.10	1,046.93	1,297.03
Lubricating oil, engine, and electric supplies	76.22	301.60	377.82
Pilotage and canal tolls		53.00	53.00
Total	326.32	1,401.53	1,727.85
Grand total	5,816.62	9,022.77	14,839.39

The total capital cost and operation, it will be noted, was $14,839.39. From this amount should be deducted $5,500, receipts from fines, penalties, and forfeitures, and $497, gasoline purchased and remaining on hand in depots on June 30, leaving a balance of $8,842.39, offset in part by the current value of the vessel. The first cost was $4,500, to which permanent improvements in structure amounting to $1,553.68 were added, making a total of $6,053.68. Were the vessel operated by a private corporation the sum of $908.06 for interest, insurance, and depreciation should be added to the expenditures stated in the table above. Although it is not customary to allow for these items in the case of Government vessels, they can not be ignored in a business statement. Reckoning annual depreciation at 11 per cent the value of the boat on June 30, 1913, was $5,388.68. At that time there would have been no difficulty in obtaining purchasers at $6,000. It is quite manifest that the expenses of annual operation of a vessel of the type of the *Tarragon* will usually be met by the mitigated fines and penalties for violations of law reported through her activities.

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During August and half of September of the current fiscal year the *Tarragon* visited New York Harbor and vicinity, reporting 607 violations of law. The vessel is being equipped with wireless apparatus, devised by the officers of the Bureau of Standards, and during the current fiscal year will carry a competent wireless inspector. Incidentally the apparatus and inspector are designed to increase the security of the boat and its usefulness to other vessels. The prime consideration, however, is to secure compliance with the act to regulate radio communication. During the cruises from port to port the radio inspector on the vessel will have exceptional facilities for observing current radio communication and for reporting infractions of the law upon the subject which might not be observed by the radio inspectors stationed at the principal seaports. The expense of installation and the radio inspector on the vessel will be charged, accordingly, to the appropriation for enforcement of the international convention and the acts to regulate radio communication and requiring apparatus and operators on ships. It is proposed during the current year that the *Tarragon's* inspection trips shall extend from Key West, Fla., to Eastport, Me.

ESTIMATES FOR 1915.

Since 1910 Congress has appropriated annually $15,000 for the enforcement of the navigation laws. The estimates for the next fiscal year recommend an appropriation of $35,000. The increase of $20,000 is to purchase, maintain, and operate another vessel similar to the *Tarragon* for use mainly during the season of motor-boat navigation from Delaware Bay to the northern coast of Maine. During the winter season the new vessel, if authorized, will be assigned to duty from the Chesapeake to Florida and the *Tarragon* will be assigned to duty at Gulf ports and on the Mississippi River.

The *Tarragon* is 63 feet over all—13 feet beam, with a running draft of 4 feet—and maintains an average speed of 12 knots (which may be increased to 13). Its crew comprises the navigating officer, master, engineer, radio inspector (who also does clerical and incidental work), and cook. This vessel was designed more particularly for use in the Chesapeake Bay and southern waters. Outside of her usefulness in enforcing the navigation laws, the vessel has served other purposes, as indicated in the following report of the United States attorney for Maryland on March 17, 1913:

> Work that your Department has done through Collector Dryden and the motor boat *Tarragon* has been of enormous benefit to the oyster shipping and the general conditions in the bay. There have been this winter reported to me no serious violations of the shanghaiing law nor of the law as to the treatment of the crews. I feel that the presence of the *Tarragon* under the active supervision of Collector Dryden has prevented the occurrence of cases which have been numerous in previous years, and I hope that a similar line of work will be carried on by your Department in the season of next year.

For the northern coast a vessel of the same speed will serve the purpose but the draft of course should be about 5 feet with 14 feet beam and corresponding length over all of about 90 feet. In any comparison of the economy in enforcing the laws with vessels of this type it should be borne in mind that such vessels can reach places inaccessible to larger vessels and that the complete cost of operation is covered by the estimate. Where collectors of customs and their

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subordinates are employed for this purpose their salaries and expenses, while so employed, do not appear in the cost of the service, being payable from the general customs appropriation. The receipts from fines, penalties, and forfeitures under the navigation laws in the fiscal year ended June 30, 1912, amounted to $31,578.13 and during the year ended June 30, 1913, to $31,987.85. Cases which have been in litigation for some time (one involving $9,000 in penalties) or have not yet been finally acted upon by the Department will appreciably increase these receipts. With the increased activities possible under the proposed project the service will be substantially self-sustaining.

MOTOR BOATS.

There are probably about 250,000 motor boats in the United States which are employed during varying periods of the year for commercial purposes or for pleasure. To a very great extent sail vessels and fishing vessels are now equipped with motors as auxiliary to sail power, and the extent to which motor boats have taken the place of larger rowboats for pleasure purposes are within the observation of everyone. The change in methods of transportation thus effected has brought about its own perils, just as the increasing use of automobiles on the land has brought risks as well as advantages. Up to three years ago this form of transportation had not received the attention its importance justified. The laws until recently in force applicable to these vessels were framed years ago, before power in this form had come into general use, and those laws in the main were not adapted to the situation. The act of June 9, 1910, was a practical and reasonable measure and has had the cordial support, in the main, of all those concerned in the manufacture and use of motor boats, either for trade or pleasure. Several slight changes might be made to simplify administration, but its essential features are satisfactory. There are no complete returns available as to the use and security of motor boats. Within the limited field of its operations, the Life-Saving Service has prepared statistics which are the only ones available to my knowledge. They give the following results:

ACCIDENTS TO MOTOR BOATS 1909–1913.

	1909	1910	1911	1912	1913
Number of vessels involved	568	756	809	982	1,038
Value	$791,315	.....	.....	$1,525,887	$1,739,660
Persons on board	1,959	2,747	3,049	3,221	4,088
Lives lost	10	6	12	10	17

The percentage of loss of life is perceptibly less now than in 1909.

In 1909, from the returns of collectors of customs, it was estimated that the number of motor boats in the United States was approximately 100,000, while at the present time, as indicated, there are probably more than double that number. There is no accurate basis for conjecture as to the number of persons carried on these boats during the year.

It does not seem feasible or necessary to apply in their entirety the laws and regulations governing steam vessels (of which there are

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about 8,000 subject to the inspection laws), to thirty times that number of motor boats. The cost of administration would be very large and the need does not, to my mind, justify the expenditure. At the same time it does not seem right that there should be no restriction whatever upon the number of passengers that can be carried upon the motor boat beyond the requirement that there must be a life preserver for each person carried. That requirement in itself is a reasonable regulation in the case of small boats. When, however, as is frequently the case, 25, 50, or as many as 100 persons are crowded on these small boats, serious risks are incurred, which it is the part of prudence to diminish by legislation.

The passage of a law is suggested providing that motor boats shall not carry passengers in excess of an arbitrary fixed number, unless they have been subject to the inspection prescribed for the like type of steam vessels and unless those in charge of them have been licensed after examination in the same manner as the corresponding officers on steam vessels are licensed. Such legislation should not take tonnage as its basis but should be based on the length of the vessel over all, which is much more readily ascertained. Legislation along these lines should consider also the nature of the waters on which the boat is employed. After consultation with those competent to express correct and disinterested opinions on the subject, it is hoped to submit a draft of a bill for your consideration.

The advantages of a Federal system of numbering motor boats were presented at some length in last year's report by the officers more directly concerned with the administration of the motor-boat law. The States have found it necessary to establish systems of numbering automobiles, and for some reasons a Federal system of numbering motor boats may be necessary. The following measure seems as simple as can be devised, if Congress shall deem it necessary to take up the subject:

A BILL To require numbering and recording of undocumented vessels.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That every undocumented vessel, operated in whole or in part by machinery, owned in the United States and found on the navigable waters thereof, except public vessels, shall be numbered and a record thereof kept in the customhouse of the district in which the owner or managing owner resides.

SEC. 2. That the said numbers, on application of the owner or master, shall be awarded by the collector of customs of the district in which the vessel is owned, and shall be not less in size than three inches and painted or attached to each bow of the vessel in such manner and color as to be distinctly visible and legible.

SEC. 3. That notice of destruction or abandonment of such vessels or change of their ownership shall be furnished within ten days by the owners to the collectors of customs of the districts where such numbers were awarded. Such vessels sold into another customs district may be numbered anew in the latter district.

SEC. 4. That the penalty for violation of any provision of this act shall be ten dollars, for which the vessel shall be liable and may be seized and proceeded against in the district court of the United States in any district in which such vessel may be found.

SEC. 5. That the Secretary of Commerce shall make such regulation as may be necessary to secure proper execution of this Act by collectors of customs and other officers of the Government.

This Act shall take effect six months after its passage.

This measure would mean the printing of about 500,000 cards and card records in the customhouses, and certainly at the outset in the larger districts such as New York and San Francisco additional clerical work and additional expenditure would be involved. With

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care and economy the system could doubtless be started for an expenditure of from $10,000 to $12,000, distributed among the larger customs districts. In this Bureau all the work could be done by one clerk and one stenographer at $1,200 each. The law, of course, would be of little value unless carefully enforced by inspection officers. The extent of the territory which they cover would be increased, but as an offset, if boats were so numbered, the other duties of reporting officers would be simplified. The recording of a vessel in the customhouse would give it a value as collateral.

LONDON RADIOTELEGRAPHIC CONVENTION.

The London Radiotelegraphic Convention was signed on July 5, 1912, and was ratified by the Senate of the United States on January 22, 1913. By its terms it took effect on July 1, 1913, the beginning of the current fiscal year. The Department of Commerce, with the cooperation of the Navy Department, War Department, and the Revenue-Cutter Service of the Treasury Department, began the enforcement of its self-executing provisions on September 1, 1913, the earliest date at which the necessary preliminary arrangements could be completed. The substantial differences between the London convention and the Berlin convention already in force were known confidentially to the committees of Congress concerned with pending legislation relating to radio communication, and but slight changes, consequently, will be required in the act of July 23, 1912, to require apparatus and operators for radio communication on certain steamships and in the act of August 13, 1912, to regulate radio communication. The most important technical change in the new convention is to increase from 300 meters to 600 meters the normal wave length for stations on shipboard to correspond with the progress in the art. The London convention is important in that it recognizes the principle of the pure and sharp wave, the authority of the master of the ship over the radio service on shipboard, the necessity for auxiliary apparatus for emergency use in event of the failure of the ship's main power plant, and the need of a constant watch (two operators), at least on board the larger passenger steamers. These provisions had already been included in the measures which Congress enacted into law soon after the signing of the convention in London.

At the London Conference on Safety at Sea, in November, the subject of radio communication will again be considered. It is advisable, therefore, to await the conclusions of that convention before undertaking to make the slight changes in our own statutes necessary to bring them into entire accord with the London Radiotelegraphic Convention.

RADIO COMMUNICATION.

As outlined in last year's report, the field service under the original act requiring apparatus and operators for radio communication on ocean steamers, passed July 24, 1910, was used as the framework for the much more extended organization called for by the act of July 23, 1912, and the act of August 13, 1912, to regulate radio communication. The latter act did not take effect until December 13, 1912, and consequently was in operation for only about half of the fiscal year. Work under the original act of 1910 was virtually confined to the seaports of New York, San Francisco, and Baltimore, with 6 brief

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inspection trips to 14 other ports. Under the new acts the inspection service has been maintained at the principal ports with increased efficiency, and in addition the radio inspectors have visited practically all of the principal seaports of the United States, ports on the Great Lakes, and many interior cities, in all 96 centers of radio communication. The chief inspector examined and adjusted the radio stations among the Hawaiian Islands and another inspector made a week's tour through Porto Rico, concluding arrangements which it is believed will secure compliance with the law even in the absence of an inspector. The stations on the Hawaiian Islands and in Porto Rico are in constant communication with ships at sea and their maintenance and operation in compliance with law requires at least annual inspection. It was not practicable to inspect the commercial stations in Alaska during the past fiscal year but this work will be undertaken during the spring of 1914. The table following shows at a glance the territory covered by the Bureau's radio inspectors and the periods during which the chief inspector and 10 inspectors were employed.

RADIO FIELD SERVICE.

Dates when districts were manned (headquarters in parentheses): No. 1 (Boston), one inspector November 11, 1912; No. 2 (New York), one inspector entire year, an additional inspector from November 1, 1912; No. 3 (Baltimore), one inspector entire year; No. 4 (Savannah), one inspector March 1, 1913; No. 5 (New Orleans), one inspector entire year; No. 6 (San Francisco), one inspector entire year, an additional inspector during interval from January 16, 1913, to June 30, 1913; No. 7 (Seattle), one inspector November 11, 1912, to January 16, 1913, continuously, and from then on intermittently for a total period of approximately 10 days; No. 8 (Cleveland), one inspector November 18, 1912; No. 9 (Chicago), one inspector November 18, 1912.

INSPECTIONS AND EXAMINATIONS.

Port visited.	Stations inspected.				Operators examined.		
	Ship.	Commercial.	Amateur and special.	Total inspections.	Commercial.	Amateur and special.	Total examinations.
First district:							
Boston, Mass.	176	4	44	224	1	9	10
Cambridge, Mass.	.....	.....	3	3	.....	.....	.....
Fall River, Mass.	.....	.....	9	9	.....	.....	.....
Forest Hills, Mass.	.....	.....	1	1	.....	.....	.....
New London, Conn.	.....	1	.....	1	.....	.....	.....
Newport, R. I.	.....	.....	8	8	.....	.....	.....
Newton, Mass.	.....	.....	20	20	.....	.....	.....
Point Judith, R. I.	.....	1	.....	1	.....	.....	.....
Portland, Me.	2	1	3	6	.....	3	3
Providence, R. I.	.....	.....	24	24	.....	11	11
Quincy, Mass.	1	.....	.....	1	.....	.....	.....
Salem, Mass.	.....	1	6	7	.....	.....	.....
Siasconset, Mass.	.....	1	.....	1	4	.....	4
Somerville, Mass.	.....	.....	3	3	.....	.....	.....
South Wellfleet, Mass.	.....	1	.....	1	4	.....	4
Woods Hole, Mass.	.....	.....	2	2	.....	1	1
Total	179	10	123	312	9	24	33
Second district:							
New York, N. Y.	802	16	11	829	.....	.....	.....
Bayonne, N. J.	.....	.....	1	1	.....	.....	.....
Sagaponack, N. Y.	2	.....	.....	2	.....	.....	.....
Sayville, N. Y.	.....	1	.....	1	.....	.....	.....
Seagate, N. Y.	.....	2	.....	2	.....	.....	.....
Total	804	19	12	835	.....	.....	.....

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INSPECTIONS AND EXAMINATIONS—Continued.

Port visited.	Stations inspected.				Operators examined.		
	Ship.	Commercial.	Amateur and special.	Total inspections.	Commercial.	Amateur and special.	Total examinations.
Third district:							
BALTIMORE, MD	315	2	38	355	176	35	211
Cape May, N. J.		1		1	3		3
Norfolk, Va.	12	2		14			
Philadelphia, Pa.	89	12	1	102	6		6
Virginia Beach, Va		1		1			
Washington, D. C.						2	2
Wilmington, Del.	1		1	2			
Total	417	18	40	475	185	37	222
Fourth district:							
SAVANNAH, GA.	114	1	4	119	6	8	14
Cape Hatteras (Buxton), N.C		2		2	3		3
Ensenada, P. R.		1		1			
Jacksonville, Fla.		2		2	1		1
Key West, Fla.	2		3	5			
Pensacola, Fla.			2	2			
San Juan, P. R.	2			2			
Tampa, Fla.	5	3		8	2		2
Total	123	9	9	141	12	8	20
Fifth district:							
NEW ORLEANS, LA.	396	6	46	448	11	4	15
Burrwood, La.		1		1			
Fort Morgan, Ala.		3		3			
Galveston, Tex.	2	2	6	10	8		8
Grand Island, La.		1		1			
Houston, Tex.		2		2	3		3
Mobile, Ala.	1	3	6	10	2	1	3
Port Arthur, Tex.		6	2	8	5		5
Texas City, Tex.					4		4
Total	399	24	60	483	33	5	38
Sixth district:							
SAN FRANCISCO, CAL.	1,088	5	4	1,097	570	44	614
Avalon, Cal.		1		1			
DeRussey, Hawaii		1		1			
East San Pedro, Cal.		1		1			
Heeia Point, Hawaii		1		1			
Honolulu, Hawaii	2			2	1		1
Kahuku, Hawaii		2		2			
Kaunakakai, Hawaii		1		1			
Kewaihae, Hawaii		1		1	1		1
Koko Head, Hawaii		2		2			
Lahaina, Hawaii		1		1			
Lihue, Hawaii		1		1			
Long Beach, Cal.			5	5			
Los Angeles, Cal.		6	71	77	15	34	49
Ocean City, Cal.			5	5			
Pasadena, Cal.			5	5			
San Diego, Cal.	1	1		2			
San Pedro, Cal.		2		2			
Total	1,091	26	90	1,207	587	78	665
Seventh district:							
SEATTLE, WASH.	108	6	1	115	12	7	19
Astoria, Oreg.	7	1	3	11	6		6
Friday Harbor, Wash.		1		1			
Marshfield, Oreg.	1	1		2	1		1
Portland, Oreg.			1	1			
Total	116	9	5	130	19	7	26
Eighth district:							
CLEVELAND, OHIO	41	8	129	178	140	84	224
Akron, Ohio		1	1	2	2	1	3
Battle Creek, Mich.		1		1			
Buffalo, N. Y.	1	1	18	20	6	20	26
Conneaut, Ohio	2			2			
Detroit, Mich.	3	1		4			
Fredonia, N. Y.			2	2		2	2
Grand Haven, Mich.		1		1	1		1
Total	47	13	150	210	149	107	256

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INSPECTIONS AND EXAMINATIONS—Continued.

Port visited.	Stations inspected.				Operators examined.		
	Ship.	Commercial.	Amateur and special.	Total inspections.	Commercial.	Amateur and special.	Total examinations.
Ninth district:							
CHICAGO, ILL.	19	6	24	49	67	33	100
Beloit, Wis.			5	5		6	6
Duluth, Minn.		1	3	4	5		5
Illiopolis, Ill.			2	2			
Indianapolis, Ind.			4	4	5		5
Kansas City, Mo.		1	2	3	1		1
Kenosha, Wis.			4	4	9		9
Lafayette, Ind.			2	2	5		5
Manitowoc, Mich.		1	3	4	1		1
Milwaukee, Wis.	6	2	17	25	8	13	21
Minneapolis, Minn.			10	10	2	2	4
Racine, Wis.			4	4	3		3
St. Paul, Minn.			5	5		2	2
Valparaiso, Ind.			2	2	5		5
Total	25	11	87	123	111	56	167
Grand total	3,201	139	576	3,916	1,105	322	1,427

The total number of ship inspections in the table is 3,201. The number of such inspections in the two Great Lakes districts is relatively small, as it covers only the three months of April, May, and June; and the territory of each of these inspectors embraces several States. The ship inspections are now much more thorough and extended than were required under the original act of 1910. The later act not only extended the number of ships subject to inspection but it increased the requirements for apparatus. An auxiliary power supply is now prescribed, capable of working at least 4 hours over a distance of 100 miles, and the wisdom of this requirement was shown at the time of the loss of the steamer *State of California* and the British steamers *Templemore* and *Volturno*, in which cases it was necessary to make use of the auxiliary power supply. The revised act also requires efficient communication between the operator in the radio room and the master on the bridge. Inspectors are also required under the act to regulate communication to make sure that pure and sharp waves are emitted so as to prevent interference. The practical work of inspection is at least fourfold more thorough than under the original act of 1910. A constant wireless watch, involving the employment of two operators, is now prescribed by law and the number of operators subject to examination by inspectors has accordingly more than doubled.

The table above shows progress in the main satisfactory in securing compliance with the acts of Congress. The measure of success attended has been due in large measure to the zeal, enthusiasm, and good judgment of the corps of trained young men who have been secured as radio inspectors. They have already won for the service the respect of the most competent men engaged in radiotelegraphy and have secured the cooperation of the owners and masters of steamships, who, in many instances, now insist that wherever practicable the radio inspector shall examine the apparatus on board and certify to its condition before the ship leaves port. These men have all served day and night and in no instances have the full statutory vacations been requested.

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Efforts during the current year, as heretofore, will be directed, first, toward promoting the efficiency and thoroughness of the work on shipboard; second, to the careful regulation of commercial shore stations; and finally, as opportunity offers, to subjecting amateur and special stations to such regulation and inspection as may be necessary to give effect to the will of Congress.

EXPENDITURES FOR THE YEAR ENDED JUNE 30, 1913.

The following table gives a concise statement of all the expenditures, aggregating $37,735.55, during the past fiscal year for all services rendered under the two acts mentioned and for the execution of the International Radiotelegraphic Convention by the Department of Commerce, excluding valuable services which can not be appraised in money rendered by the technical corps of the Bureau of Standards in the invention and improvement of appliances for the inspection of apparatus and in offering technical advice and instruction to the inspection corps.

Item.	Baltimore.	Boston.	Chicago.	Cleveland.	New Orleans.	New York.	San Francisco.
Equipment:							
Furniture	$0.45	$78.56	$5.25	$0.45	$0.45	$4.65	$13.45
Instruments	461.95	609.96	454.30	451.93	625.94	1,252.62	618.64
New construction	10.00				9.43		1.50
Typewriting machines, etc.	108.65	67.40	66.09	67.39	67.40	140.01	67.40
Laundry	1.54		4.52	2.24	.75		1.00
Repairs		5.55					9.00
Salaries	2,017.00	1,206.00	1,040.33	1,102.50	1,682.67	3,811.66	3,211.83
Services, nonpersonal	7.90	3.10	4.80	.50	7.38	2.70	8.35
Stationery:							
Books	29.53	24.37	24.62	29.87	29.53	67.13	29.53
Printing	20.59	40.75	39.80	23.84	39.81	75.92	26.74
Supplies	13.72	16.04	20.78	18.85	16.68	31.94	25.99
Supplies:							
Household	.23	.23	.23	1.08	.23	.46	.23
Cleaning and toilet	.10	.10	.09	.09	.10	.18	.09
Mechanics', engineers', and electricians'	.89	.89	.89	.89	.89	2.89	3.73
Other supplies	1.94	1.95	1.94	1.94	1.94	3.90	1.94
Telegrams	5.90	6.10	7.28	6.77	10.27	22.62	22.98
Telephones	26.59	21.50	.60	25.55	1.55	19.91	1.52
Transportation, persons	450.90	50.60	156.41	98.28	311.65	34.77	471.83
Street car fare	20.60	26.77	7.20	8.75	13.60	31.24	19.20
Subsistence	387.37	35.45	177.00	101.35	215.45	13.90	387.50
Express and freight	19.36	13.88	16.07	13.06	27.27	14.76	30.65
Total	3,585.21	2,209.20	2,028.20	1,955.33	3,062.99	5,537.16	4,957.20

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Item.	Savannah.	Seattle.	St. Louis.	The Tarragon.	Bureau.	Total.
Equipment:						
Furniture	$0.45	$0.45			$104.05	$208.21
Instruments	451.95	446.90		$1,420.00	2,017.44	8,811.63
New construction		5.60		580.00		606.53
Typewriting machines, etc.	67.40	67.40			138.75	857.89
Laundry		.20	$10.55		1.42	22.22
Rent, storage	1.28					1.28
Repairs					6.25	20.80
Salaries	725.00	573.33	303.26		4,328.22	20,001.80
Services, nonpersonal	.25	6.90	4.60		1.25	47.73
Stationery:						
Books	24.37	24.37	8.50		44.07	335.39
Newspapers					.25	.25
Printing	39.80	15.73			1,721.70	2,044.68
Supplies	12.10	11.84	2.40		72.44	242.78
Supplies:						
Household	.23	.23				3.15
Cleaning and toilet	.10	.09				.94
Mechanics', engineers', and electricians'	.89	2.46			.24	14.66
Other supplies	1.94	1.94	1.94		3.90	25.27
Telegrams	6.24	9.38	5.90		21.00	134.44
Telephones		.82	1.35		.75	100.14
Transportation, persons	6.00	207.10	265.70		97.91	2,151.15
Street car fare	10.00	4.40			4.85	146.61
Subsistence	6.45	174.24	178.85		117.90	1,795.46
Express and freight	4.70	12.89	6.15		3.25	162.04
Total	1,359.15	1,566.27	789.20	2,000.00	8,685.24	37,735.55

Total appropriation	$37,880.00
Total expended	37,735.55
Balance unexpended	144.45

In the table above the Bureau of Navigation is charged with $8,685.24. Of this amount, however, $2,017.44 is for special inspection apparatus retained ordinarily in the Bureau but sent to different ports to meet special requirements. The largest expenditure in any one district is $5,537.16 for the district comprising the city of New York, Long Island, the Hudson River to Albany and Troy, and most of the seacoast of New Jersey. The service at this port has been maintained by two radio inspectors with the assistance from time to time for office work of one or two stenographers. If it be recalled that over a million passengers are carried out of or into the port of New York by the ships whose wireless apparatus is to be closely examined by the inspectors before the ship sails, the expenditure of this amount seems very reasonable. The expenditures at San Francisco were $4,957.20, at Baltimore $3,585.21, and at New Orleans $3,062.99. In the remaining districts the service was not established until the fiscal year was well advanced. Toward the close of the fiscal year arrangements were made to equip with wireless the United States motor boat *Tarragon*, through which the navigation laws are enforced along the Atlantic seaports. The purpose in equipping this vessel was not so much its safety and convenience, though those considerations had weight, as to maintain a station moving from port to port which could note infractions of the laws concerning radiotelegraphy and secure compliance with them.

The largest item is $20,001.80 for salaries. Besides pay for the inspectors this amount covers expenses from time to time of stenographers and typewriters to assist them in office work. There is no economy in assigning typewriting work to a high-grade man whose services are worth from $1,800 to $2,100 for the actual inspection of

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delicate wireless apparatus on shipboard. The purely clerical work of these offices is well paid at the rate of $900 per annum and wherever the volume of such clerical work justifies it a stenographer and typewriter has been continuously employed during the busy season, or at some ports, for one or two days a week. The inspection services at some ports did not begin, as already indicated, until November; so the expenditures for salaries for the present and next fiscal years will be larger.

On the other hand, during the past fiscal year $8,811.63 was expended for instruments. This amount covers the necessary instruments for each inspector, including the decremeter invented for the service by Mr. Frederick A. Kolster, of the Bureau of Standards. By this instrument such good results have already been secured that the War and Navy Departments and commercial companies have since adopted it. A much smaller expenditure for instruments will suffice for some time to come but a reasonable allotment must be made for this purpose to keep step with the development of the art. The amount expended for travel and subsistence was $3,946.61, and this amount, of course, will be exceeded during the current year and the next fiscal year. The expenditures for printing have amounted to $2,044.68 and expenditures for this purpose hereafter will be covered in the Department's general printing allotment.

The examination of applicants for licenses as radio operators has been conducted by the Department's inspectors, with the cordial cooperation of the radio services of the Army and Navy. The standard of these examinations has been raised during the year and operators under the Department's licenses now compare favorably with operators licensed by foreign governments. The following table shows the number of licenses to operators of the various classes issued in the several radio districts:

RADIO OPERATORS' LICENSES ISSUED, BY DISTRICTS.

	Commercial grades.		Experiment and instruction grade.	Cargo grade.	Amateur grades.		Total.
	First.	Second.			First.	Second.	
First district:							
Radio inspectors			1		22	49	72
Army and Navy [a]	173	3					176
Second district:							
Radio inspectors						58	58
Army and Navy	[b] 494	[b] 97		1	366		958
Third district:							
Radio inspectors	47	13	6		32	50	148
Army and Navy	195	19	1				215
Fourth district:							
Radio inspectors	5				7	29	41
Army and Navy	12	3					15
Fifth district:							
Radio inspectors	18	7			4	28	57
Army and Navy	41	1					42
Sixth district:							
Radio inspectors	465	37			95	297	894
Seventh district:							
Radio inspectors	35	3			3	16	57
Army and Navy	65	25					90
Eighth district:							
Radio inspectors	61	49			105	238	453
Ninth district:							
Radio inspectors	21	58			22	1	102
Total	1,632	315	8	1	[c] 691	766	[c] 3,413

[a] Licenses issued by examining officers of the Army and Navy.
[b] Not included in these figures were 129 applicants examined who failed to qualify.
[c] This total includes 35 licenses not classified by districts.

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ADMEASUREMENT OF VESSELS.

With the formal opening of the Panama Canal for navigation, barely a year distant, the revision of our laws governing the admeasurement of vessels can not long be delayed. It would be desirable if such revision could be effected at the coming session of Congress. The subject was referred to at some length in the report of this Bureau for the year 1911, at pages 28 to 42 and 237 to 239. By the act of March 2, 1895, the admeasurement laws of the United States were brought into substantial accord with the laws of Great Britain, Germany, and other maritime nations. That act, however, differed from the current British law in that it did not contain the provision for the measurement of deck cargoes, which reads as follows:

> If any ship carries as deck cargo, that is to say, in any uncovered space not included in the cubical contents forming the ship's registered tonnage, timber, stores or other goods, all dues payable on the ship's tonnage shall be payable as if there were added to the ship's registered tonnage the tonnage of the space occupied by those goods at the time at which the dues become payable.

The absence of such a provision has led to considerable differences between the British and American interpretation of the laws in so far as they relate to the so-called shelter-deck spaces. Another variation arises from the provision in section 4151, Revised Statutes (act of Feb. 28, 1865), by which no part of any vessel used for "cabins or staterooms, and constructed entirely above the first deck, which is not a deck to the hull" is to be measured. This provision seems to have been included originally in the law to meet the exceptional construction of steamboats on the Mississippi River, but its general terms and the practice of half a century have given to it general application. Its interpretation is somewhat difficult, as it is not always easy to determine whether a deck is or is not a deck to the hull. Cases have arisen where to secure the exemption from measurement and consequent reduction in various charges, the principles of safe construction have been barely complied with if, indeed, not actually transgressed.

It is not necessary to review in detail in this place the laws on the subject of admeasurement here and abroad. A comprehensive and authoritative report on this subject has just been published by Prof. Emory R. Johnson, of the Isthmian Canal Commission, which is the most thorough treatise on admeasurement in any language.

The principal question to be determined in a revision of the admeasurement laws is one of general policy. The regulations for the measurement of vessels passing through the Panama Canal in all essential particulars are similar to the rules for the measurement of vessels passing through the Suez Canal. These rules are considerably different from the rules employed by the United States, Great Britain, Germany, and France for the measurement of vessels entering and clearing at their ports. Both the Panama and the Suez Canals rules measure the space devoted to propelling power and bunker coal according to the so-called Danube rule. Maritime nations generally employ for the measurement of this space the British or, as it is generally known, the Board of Trade rule. Under the Danube rule the deductions for propelling power, etc., are much less than under the Board of Trade rule and, in consequence, the net tonnage on which canal tolls and other charges are levied is considerably larger. The

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canal rules for the measurement of shelter-deck spaces are also more stringent than the Board of Trade rules and result in a larger tonnage. In a general way the differences in results obtained under the two rules were shown at pages 38 and 39 of the Bureau's report for 1911. The gross tonnage of the steam vessels of the world in 1910, as shown by Lloyd's Register, was 34,639,927 tons and the net was 21,114,643 tons. In other words, 39 per cent of the gross tonnage of these steam vessels, on an average, had been deducted to secure the net tonnage. The vessels which passed through the Suez Canal in 1909 measured 21,500,847 gross tons (15,407,527 net tons), so that the deductions at Suez from gross tonnage to determine net tonnage amounted only to 28.3 per cent. Of course numerous qualifications and restrictions would have to be made in order to institute an exact comparison between these two groups of figures. They serve, however, to illustrate the fact that net tonnage ascertained under the Suez and coming Panama rules will be materially greater than under the British and German rules.

It seems quite clear that the United States should bring its system of admeasurement into precise accord either with the system for the two great canals or with the British and German systems. The choice is not easily made. At the outset all considerations of Federal revenue may be dismissed, as the average receipts from this source amount to only about a million dollars and during the current year amounted to $1,273,788.63. The adoption of the British and German rules for the purpose of the United States would not diminish the revenue by more than $100,000 and the adoption of the new Panama rules for the entire United States would not increase the revenue by more than that sum.

Federal charges on tonnage, however, are light by comparison with the corresponding charges imposed by foreign governments. Under our general arrangement if the Panama system of measurement were adopted in this country for all ships, we could doubtless furnish the few American ships which visit foreign ports with certificates of admeasurement in accord with foreign laws which would be accepted as the basis of charges in such ports. The heaviest charges imposed in the United States on shipping are those for State and municipal purposes and for private services rendered, such as the use of dry docks. A change in the system of measurement, involving increased Federal tonnage, would of course carry with it a substantial increase in many of these charges. On the other hand, the system of measurement which has been prepared by Prof. Johnson for the Panama Canal is the result of careful study and investigation and of extended conference with the most competent authorities in England, Germany, and France. It is without doubt the most exact application of the scientific principles which should govern the subject yet prepared.

The general outline of the problem, which it is hoped Congress will solve during the coming session, has been set forth and a specific measure will be submitted later for your consideration. This delay will not involve loss of time as it will enable those interested in the subject to study the Johnson report and Panama rules recently promulgated. With any change in the measurement laws, an appropriation should be made sufficient to provide for the additional staff of admeasuring officers in the principal customhouses, required at least for a time. Congress has already made a small appropriation

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of $3,000 to enable the Bureau to secure greater uniformity under the laws which now obtain, and with a change of system a temporarily increased force will be required.

WORK OF SHIPPING COMMISSIONERS.

Summaries of the work of shipping commissioners for the past fiscal year, so far as they can be expressed in statistical terms, are printed in Appendix A. At the beginning of the past fiscal year there were 16 shipping commissioners, with 32 deputies; in all a total of 48 men.

On July 7 the office of shipping commissioner at Honolulu was discontinued. The estimates for the coming year provide for no new commissioners but after the opening of the Panama Canal to traffic it will doubtless be necessary to reestablish the offices at Honolulu and Mobile and possibly to establish an office at San Diego, Cal. Some increase in the clerical force at other ports will then be desirable. Several bills relating to seamen have been considered of late years by Congress but as yet no final action has been taken. The enactment of any of these measures will materially extend the scope of activities of the shipping commissioners and for this increased work provision must be made in the appropriation bills if this work is to be done satisfactorily.

The following summary shows the aggregate routine work and salaries of shipping commissioners and deputies for the past decade:

Year.	Seamen shipped, reshipped, and discharged.	Salaries.	Average cost per man.	Year.	Seamen shipped, reshipped, and discharged.	Salaries.	Average cost per man.
1904	201,273	$61,548.12	$0.31	1909	341,980	$62,944.79	$0.18
1905	218,031	59,282.67	.27	1910	356,448	65,539.19	.18
1906	227,392	60,595.23	.26	1911	367,023	67,155.90	.18
1907	259,570	61,716.60	.24	1912	374,783	63,373.53	.17
1908	307,299	63,585.16	.21	1913	379,188	62,374.13	.16

The table above shows that with an appropriation substantially the same as 10 years ago the routine work of the commissioners' offices has more than doubled, so that the average cost per man for the service rendered by shipping commissioners is only half what it was 10 years ago. These results have been brought about in part by the zeal and interest of the force at the various ports. The tables represent only the routine work of the offices which can be expressed in comparative figures. The important work of these officers consists in adjusting disputes between masters and owners and seamen, thus saving litigation, and in the enforcement of the laws relating to allotments and shanghaiing.

During the year 33 collectors of customs acting as shipping commissioners have shipped 3,671 seamen and discharged 2,640.

On June 30, 1913, shipping commissioners were holding (temporarily) wages due to seamen amounting to $9,516.68 distributed among the following ports: Baltimore, $28.64; Boston, $65.08; New Orleans, $10.15; New York, $3,772.07; Norfolk, $79.33; Portland, Me., $36.09; Philadelphia, $68.17; Port Townsend, $1,330.65; and San Francisco, $4,126.50. The shipping commissioners at the fol-

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lowing ports reported that they had no funds on hand belonging to seamen: Bath, Gloucester, New Bedford, Pascagoula, Providence, and Rockland. These amounts are funds left with the commissioners by owners or masters for seamen who have failed to report to the shipping commissioners' offices for wages due them. They are held by the commissioners, all of whom are bonded officers, for the convenience of seamen and in the main represent a large number of small amounts covering in some instances a period of years. By direction of the Secretary of Commerce monthly statements of these accounts are now required from each shipping commissioner. Shipping commissioners have no funds in their possession belonging to deceased seamen, as under section 4543 of the Revised Statutes shipping commissioners receiving any such wages of deceased seamen are required within one week to deliver them to the district court.

NATIONALITY OF CREWS.

The men shipped and reshipped (including repeated voyages) by shipping commissioners on vessels of the United States during the past seven fiscal years were classed by nationality as follows:

Nationality.	1907	1908	1909	1910	1911	1912	1913
Americans (born)	44,095	52,065	58,692	59,810	59,802	58,109	63,040
Americans (naturalized)	25,737	28,713	31,073	31,736	31,810	35,562	22,780
British	16,606	19,964	21,572	21,047	23,674	21,033	24,031
Chinese	267	369	127	137	68	55	65
Japanese	614	585	686	480	380	290	193
Filipinos	52	120	135	126	126	184	258
Germans	5,276	6,158	6,153	6,832	7,673	7,185	9,185
Norwegians	6,810	8,182	9,031	9,190	9,889	9,304	8,679
Swedes	4,587	6,008	6,571	7,123	6,615	7,565	6,995
Danes	1,895	2,316	2,238	2,293	2,590	2,744	2,510
Russians	3,083	3,714	3,750	3,684	3,956	4,403	4,433
Austrians	1,160	1,430	1,527	1,513	1,838	2,240	2,980
French	638	630	762	517	610	614	615
Spanish	16,371	17,894	23,306	24,546	26,059	26,247	20,511
Italians	5,403	3,462	3,540	3,649	4,021	3,877	4,513
Portuguese	3,332	3,850	3,901	4,078	4,197	3,924	4,384
Others	6,910	7,603	7,858	8,962	8,766	11,762	12,434
Unknown	563	129	20	13	117	3,037	68
Total	143,399	163,192	180,942	185,721	192,191	198,225	198,024
Per cent Americans	48.7	49.5	49.6	49.3	47.7	47.3	48.4

These figures do not include, of course, seamen shipped abroad before consuls on American vessels.

DESERTION OF SEAMEN.

The percentage of seamen who desert from American vessels is relatively small, and desertion has ceased to be so considerable a factor in American shipping as it was in the days of sailing vessels. The percentage of seamen who fail to report on board after having signed articles before shipping commissioners in ports of the United States for the past 10 years is shown by the following table:

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Year.	Shipped and re-shipped.	Failed to join.	Per cent.	Year.	Shipped and re-shipped.	Failed to join.	Per cent.
1904	112,957	3,857	3.41	1909	181,032	2,114	1.17
1905	120,782	3,273	2.71	1910	185,721	2,690	1.45
1906	126,745	3,894	3.07	1911	192,191	3,082	1.60
1907	143,399	4,007	2.79	1912	198,225	3,849	1.94
1908	163,192	3,101	1.90	1913	198,024	3,906	1.97

The facts concerning desertion of seamen from American vessels in foreign ports are shown by reports for the past fiscal year from 201 American consulates, which cover practically our entire consular representation at foreign maritime ports. These reports show the clearances (counting repeated voyages) of 1,727 American steamers and 445 American sail vessels. The details are printed in Appendix C. The following table shows the number of the crews of these vessels, the number of seamen shipped and discharged in foreign ports, and the number of deserters:

Vessel.	Men.	Shipped.	Discharged.	Deserters.
Steam	119,785	10,257	9,901	286
Sail	16,634	7,821	7,157	222
Total	136,419	18,078	17,058	508

Out of a total of 136,419 men (counting repeated voyages), only 508 deserted, or 1 out of 268.

The law permitting the imprisonment of seamen for desertion from American vessels in ports of the United States and in near-by foreign ports was repealed by the act of December 21, 1898. The remnant of the law, which still provides for arrest for desertion in Europe, Africa, Asia, Australia, and South America, is seldom invoked, and its repeal has been recommended in this report for several years.

ALLOTMENT NOTES.

Allotment notes in the United States to seamen under section 24 of the act of December 21, 1898, so far as American vessels are concerned, are given principally for the few square-rigged vessels still afloat under the flag. The following table shows the number of allotment notes issued in recent years to seamen on American vessels:

Year.	Creditors.		Relatives.	Total.
	Square-rigged.	All other vessels.		
1903	2,005	1,870	284	4,159
1904	1,966	1,513	287	3,766
1905	1,595	919	304	2,818
1906	1,492	421	309	2,222
1907	1,323	490	239	2,052
1908	967	393	133	1,493
1909	660	114	84	858
1910	681	145	79	905
1911	505	241	57	803
1912	555	296	62	913
1913	419	185	64	668

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The table above shows that the allotment system on vessels of the United States is well-nigh extinct, excluding the few square-rigged vessels still employed in our commerce. Only 185 allotment notes were issued to seamen, except 64 in the case of dependent relatives. The whole question of the abolition of the allotment note in the United States, accordingly, relates only to the crews of foreign cargo steamers, especially those clearing from our ports in the Gulf of Mexico and the South Atlantic States, where the seafaring population is small, and to ports on the Pacific coast.

On January 1, 1913, the maximum allotment for trans-Atlantic voyages on steamers was reduced to five days' pay. This reduction in the schedule has been carried out without any inconvenience, so far as I am aware, or any delay to commerce, and further reductions will be undertaken next year.

The Supreme Court has held that the allotment law applies with equal force to men who are secured in ports of the United States for duty on British ships as well as on American ships. The act of 1898 preserves treaty rights in the matter of allotment notes. Several efforts to obtain a judicial determination of whether in fact the treaties of various nations, excluding Great Britain, covef the issue of allotments to seamen engaged on shore in American ships have been unavailing.

TONNAGE DUTIES.

The receipts from tonnage duties last year were $1,273,789.43, an increase of $117,778.68 over the corresponding receipts for the previous year and the largest receipts from this source since 1884, when an annual duty of 30 cents per ton was levied. The rates for tonnage duties now imposed in the United States are substantially similar to the rates for the corresponding light dues imposed in the United Kingdom and are materially lower than corresponding charges imposed in the ports of the Continent of Europe and elsewhere. They are imposed without discrimination and are on a revenue basis and were not changed by the tariff act of October 3, 1913.

The collections of annual excise from foreign-built yachts owned by Americans, under section 37 of the tariff act of 1909, amounted to $492.84, and the collections since the section took effect September 1, 1909, have amounted to $68,619.21. The constitutionality of the section was contested at the outset and while the decisions of the courts thus far in the main have sustained the constitutionality of the act, the five test cases (United States *v.* Billings, United States *v.* Bennett, United States *v.* Goelet, United States *v.* Pierce, and United States *v.* Rainey) are awaiting decision by the Supreme Court of the United States. These cases were selected as presenting all the questions at issue and upon their determination, accordingly, excise amounting to about $350,000 is involved. These cases have been advanced on the calendar of the Supreme Court and the matter soon will be disposed of, as the section in question was repealed by the tariff act of October 3, 1913.

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ANCHORAGE REGULATIONS.

The Secretary of Commerce now has the power to define and establish anchorage grounds for vessels in the bay and harbor of New York, including the Hudson and East Rivers, the harbor of Chicago and adjacent waters of Lake Michigan, and the harbor of Bath, Me., and the adjacent Kennebec River. This law has proved useful, especially on occasions when the battleship fleet has visited the harbor of New York, enabling the ships to ride at anchor without risk to merchant vessels or inconvenience to commerce. It has also furnished the authority to determine the places in the harbor where quantities of explosives may be stored on shipboard. There is no Federal statute governing anchorages in the harbors of San Francisco, Boston, Baltimore, Savannah, Galveston, and other great seaports. Such regulation of anchorages is general throughout the maritime world, and in the United States seems to be especially a function of the Federal Government, and particularly of the Department charged with the execution of laws relating to commerce and navigation. A general act, similar to the specific act for New York, enabling the Secretary of Commerce to define and establish anchorage grounds in harbors, rivers, bays, and navigable waters of the United States whenever maritime and commercial interests shall show that such anchorage grounds are required for safe navigation was passed by the Senate in the Sixty-second Congress, and its enactment in the same form by both Houses is favored, as follows:

A BILL To extend the powers of the Secretary of Commerce in respect of anchorage of vessels.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Commerce is hereby authorized, empowered, and directed to define and establish anchorage grounds for vessels in improved harbors and bays of the United States except as otherwise provided by law, wherever maritime and commercial interests shall request action by, and show to the satisfaction of said Secretary that such anchorage grounds are required for safe navigation, and to adopt suitable rules and regulations in relation thereto, and to take all necessary measures for the proper enforcement of such rules and regulations.

SEC. 2. That in event of the violation of any such rules or regulations by the owner, master, or person in charge of any vessel, such owner, master, or person in charge of such vessel shall be liable to a penalty of one hundred dollars; and the said vessel may be holden for the payment of such penalty and may be seized and proceeded against summarily by libel for the recovery of the same in any United States district court for the district within which such vessel may be and in the name of the officer designated by the Secretary of Commerce.

TIMBER DECK LOADS.

As soon as wireless telegraphy made it feasible to report promptly and remove derelicts from the pathway of ocean vessels, Congress gave liberal appropriations for the purpose. The excellent work done by the United States Revenue-Cutter Service is well known in this country and last January was commended by the British Board of Trade in these words:

The provision of special means for the destruction and removal of derelicts on the western side of the north Atlantic is absolutely necessary, owing to the peculiar conditions which prevail on that coast, and the work which at present is so efficiently performed by the United States revenue cutter cruisers should, in any case, be continued, even if it were to involve the cooperation of other nations in the provision of the necessary funds.

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The work which has been done to destroy these menaces to navigation makes it the more incumbent upon us to remove, if practicable, the cause. Of 13 derelicts destroyed or salved by the Revenue-Cutter Service during the years 1909 to 1912, 11 were vessels with deck loads of timber or lumber and it may be accepted almost as a general proposition that the deck load of lumber or timber is the cause of the derelict. Foreign returns corroborate the conclusions from our reports. During the year ended June 30, 1912, British reports show that 91 British vessels on the Atlantic sustained casualties while carrying deck loads of timber or lumber. The vessels engaged in carrying such cargoes, of course, carry no passengers and the fatalities which attend them attract little notice in this country. The Dominion of Canada in 1908 enacted a law prohibiting the carriage in winter from Canadian ports of such cargoes except under rigid regulations to insure security, and the passage of a similar law by the United States is manifestly desirable.

COASTWISE CLEARANCES.

Our domestic transportation by water, of course, is in competition with railroad transportation frequently, and statutes which exact unnecessary delays in the movements of vessels in the domestic trade should be removed. Sections 4349 to 4352 which have been in force since February 18, 1793, long before there were any railroads in this country, are of this nature. They could with advantage to all concerned be amended so as to provide that vessels duly licensed as vessels of the United States to engage in the coasting trade may proceed from port to port or from place to place in the same great coasting district either laden or in ballast without reporting their departure or arrival at the customhouse, delivering manifests therein, or obtaining permits. Of course such an act should be framed so as not to be construed to amend or alter laws concerning special manifests covering the transportation of merchandise in bond by common carriers.

CONSULAR REGISTRATION OF VESSELS.

Section 5 of the Panama Canal act of August 24, 1912, admitted to American registry for the foreign trade and trade with the Philippines, Guam, and Tutuila vessels not more than five years old built in foreign countries. Under the general provisions of our laws, however, it is now necessary for a vessel built abroad to be brought to the United States in order to secure a register. In this administrative detail the laws of the United States differ from the laws of all other countries which observe the policy of free registry. These countries give to their consuls the authority to issue a provisional or temporary register valid for a year or more until the vessel shall arrive at a port of the country whose flag she flies. The absence of a provision of this nature in part doubtless accounts for the fact that thus far no foreign-built vessels have been admitted to American registry under the Panama Canal act. While the right of an American citizen to purchase a ship abroad and sail it under the American flag from the beginning has been recognized practically from the beginning of government, the only document asserting nationality

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has been the bill of sale. This situation led to the following recommendation in the annual message of President Arthur, December 1, 1884:

> The recent purchase by citizens of the United States of a trading fleet heretofore under the Chinese flag has considerably enhanced our commercial importance in the East. In view of the large number of vessels built or purchased by American citizens in other countries and exclusively employed in legitimate traffic between foreign ports under the recognized protection of our flag, it might be well to provide a uniform rule for their registration and documentation, so that the bona fide property rights of our citizens therein shall be duly evidenced and properly guarded.

These reasons for the passage of a bill giving American consuls the power to issue temporary or provisional registers to vessels built abroad owned by American citizens are reenforced by the Panama Canal act. The draft of a bill to accomplish this purpose will be submitted to you later.

PUBLICATIONS.

The List of Merchant Vessels has been issued as usual and in compliance with the act of July 9, 1912, a separate notation has been made in the case of rebuilt barges. Nearly every year a request is made that the draft of vessels be included with other information in the list. One of the difficulties in the way of publishing this information will be removed when a satisfactory load-line law shall have been drafted and enacted, based on the international agreement which it is hoped will be effected at the International Load-Line Conference to be held in London in 1914. International uniformity in this respect is plainly desirable to secure fair terms of competition between vessels of the United States and of other nations. Until within recent years very few American ocean steamers have been built to carry bulk cargoes and the absence of a load-line law did not appreciably affect the safety of life and property on American freight steamers. In the last few years the construction of such steamers has been increasing and in the next few years it is certain to increase still more rapidly. The only law the United States ever had on the subject was the following provision in the act of February 21, 1891:

> The owner, agent, or master of every inspected sea-going steam or sail vessel shall indicate the draught of water at which he shall deem his vessel safe to be loaded for the trade she is engaged in, which limit as indicated shall be stated in the vessel's certificate of inspection, and it shall be unlawful for such vessel to be loaded deeper than stated in said certificate.

The futility of this measure is evident on its face and was recognized by Congress and by all concerned after a few years trial and it was soon repealed.

A new publication containing the list of radio stations of the United States has been issued pursuant to the act of August 13, 1912, to regulate radio communication. It is proposed to issue this publication annually and to publish supplements either monthly or quarterly as experience may suggest. The edition, which must be supplied gratuitously to ship radio stations of the Navy, Revenue-Cutter Service, and other Government vessels and to the general public stations, will be limited to from 1,500 to 1,800 copies and the large demand from amateurs and others concerned will be supplied by the Superintendent of Documents at a price to cover the cost of publication.

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SUMMARY.

The measures recommended in the foregoing pages may be thus summed up:

1. General revision of laws relating to measurement of vessels.
2. General anchorage bill.
3. Bill to authorize consuls of the United States in certain cases to issue temporary registers to vessels of the United States.
4. Bill to remove certain restrictions on coastwise entries and clearances within great districts.
5. Regulation of motor boats carrying more than a fixed minimum of passengers.
6. Bill for numbering motor boats.
7. Bill concerning winter deck loads of lumber and timber.

It will not be practicable to prepare the drafts of all these measures, as is usually done, before the opening of the regular session of Congress in December. Under your direction a large portion of my time has been devoted to work on the committees on Hulls and Bulkheads, Radiotelegraphy, Efficiency of Officers and Crews, Aids and Perils to Navigation, Lifeboats and Davits, and Fire Protection, which you selected in May to make preliminary inquiries and reports for the use of the commissioners of the United States to the International Maritime Conference on Safety at Sea. This work has been almost continuous from May to late in October. If the conference shall agree upon an international convention and the Senate shall consent to the ratification of that convention, legislation upon a number of subjects will require consideration which, under other conditions, would have been taken up, as usual, in this report.

Respectfully,

EUGENE TYLER CHAMBERLAIN,
Commissioner.

To HON. WILLIAM C. REDFIELD,
Secretary of Commerce.

NOTE.—The report of the Commissioner of Navigation, as separately published, contains also the following appendixes and statistical tables:

APPENDIXES.

(A) Reports of shipping commissioners for year ended June 30, 1913—(1) Shipments, discharges, and expenditures; (2) Shipments and reshipments of seamen; (3) Number of men discharged; (4) Nationality of seamen; (5) Failures of seamen to join American vessels; (6) Men shipped to be discharged in foreign ports; (7) Allotments of wages; (8) Seamen shipped and discharged by collectors.

(B) Wages of seamen—(1) Average monthly wages paid in the American merchant marine, year ended June 30, 1913; (2) Average monthly wages paid to able seamen on American vessels, 1895–1913; (3) Average monthly wages paid to first mates on American vessels, 1895–1913; (4) Average monthly wages paid to firemen and first engineers on American steam vessels, 1895–1913.

(C) Shipments, discharges, and desertions of seamen from American vessels abroad—(1) Summary of shipments, discharges, and desertions; (2) Shipments, discharges, and desertions, by ports.

(D) Tonnage tax—Law and collections—(1) Tonnage-tax collections, 1897–1913; (2) Tonnage tax collected fiscal, year ended June 30, 1913, by ports; (3) Tonnage tax collected fiscal, year ended June 30, 1913, by nationality of vessels.

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(E) Steel-ship building in the United States—(1) Construction of steel steam vessels in the United States; (2) Steel vessels building or contracted for on July 1, 1913; (3) Price of steel ship plates in United States, Great Britain, and Germany.

(F) The world's tonnage, motive power, and materials of construction—(1) World's tonnage, based on official returns, 1850–1911 (from Return on Progress of British Shipping for 1912); (2) Number and net and gross tonnage of steam and sailing vessels as recorded by the Bureau Veritas for 1913–14; (3) Number and net and gross tonnage of steam and sailing vessels of over 100 tons, of the several countries of the world, as recorded in Lloyd's Register for 1913–14; (4) Motive power and chief materials of construction of the world's merchant marine, 1890–1913 (Lloyd's); (5) Total number and tonnage of steam vessels (over 100 tons) and sailing vessels (over 50 tons), 1890–1913 (Bureau Veritas); (6) Construction—Vessels built in the world (over 100 tons) according to Lloyd's (including vessels not recorded in Lloyd's), during 11 recent years; (7) Shipbuilding at home and abroad in 1912 (Lloyd's summary); (8) Vessels under construction September 30, 1913 (Lloyd's); (9) Number, tonnage, and nationality of vessels totally lost, condemned, etc., during the year 1912, as reported up to July 21, 1913; also the number and tonnage of steam and sailing vessels owned in each country.

(G) The world's large and fast ocean steamships—(Classification, by owners, flag, and speed.)

(H) Progress of British, German, and Japanese shipping.

(I) Registered steam vessels of the United States on June 30, 1913.

(J) Square-rigged American vessels.

(K) Foreign-built yachts—(1) Tax levied under authority of section 37 of the act of August 5, 1909, and collected during the fiscal year 1913, etc.; (2) Payment of the above tax during the present fiscal year and brought to the attention of the Bureau, etc.

(L) Tonnage taxes, fees, and fines.

(M) Radio-service statistics—(1) Class and number of radio-station licences issued; (2) Grade and number of radio-operator licences issued; (3) Names of vessels and number of inspections, by districts.

(N) Miscellaneous—(1) Foreign carrying trade of the United States, 1821–1913; (2) Tonnage of American and foreign vessels entered and cleared in the foreign trade of the United States, fiscal years 1821–1913.

STATISTICAL TABLES.

(1) Number and gross tonnage of documented vessels of the United States, by customs districts, June 30, 1913.

(2) Number and gross tonnage of documented vessels of the United States, by States and Territories, June 30, 1913.

(3) Number and gross tonnage of documented steam vessels of the United States, by customs districts, June 30, 1913.

(4) Number and gross tonnage of documented metal vessels of the United States, by customs districts, June 30, 1913.

(5) Number and gross tonnage of documented steam metal vessels of the United States, by customs districts, June 30, 1913.

(6) Class, number, and gross tonnage of metal vessels of the United States, by customs districts, June 30, 1913.

(7) Number and gross tonnage of each class of documented wooden and metal vessels of the United States, June 30, 1913.

(8) Balance sheet of tonnage accounts, showing the increase and decrease in documented vessels, June 30, 1913.

(9) Balance sheet of tonnage accounts, showing the increase and decrease in each class of vessels, June 30, 1913.

(10) Documented sailing and steam tonnage constituting the total merchant marine of the United States, 1789–1913.

(10a) Number and gross tonnage of canal boats and barges documented in the United States, in specified years, 1868–1913.

(10b) Number and gross tonnage of sailing vessels, steam vessels, canal boats, and barges documented on the northern lakes, in specified years, 1868–1913.

(11) Number and gross tonnage of sailing vessels, steam vessels, canal boats, and barges in the United States, by customs districts, June 30, 1913.

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(12) Number and gross tonnage of sailing vessels, steam vessels, canal boats, and barges in the United States, by States, June 30, 1913.
(13) Sailing and steam vessels of the United States, according to size, June 30, 1913.
(14) Number and gross tonnage of vessels of the United States engaged in the cod and mackerel fisheries, by customs districts, June 30, 1913.
(15) Number and gross tonnage of vessels of the United States engaged in the whale fisheries, by ports, June 30, 1913.
(16) Employment of the tonnage of the United States, June 30, 1913.
(17) Documented tonnage of the United States merchant marine employed in the foreign trade, the coasting trade, and the fisheries, 1789–1913.
(18) Class, number, and gross tonnage of vessels built in the United States and documented during year ended June 30, 1913, by customs districts.
(19) Class, number, and gross tonnage of sailing vessels built in the United States and documented during year ended June 30, 1913.
(20) Class, number, and gross tonnage of steam vessels built in the United States and documented during year ended June 30, 1913.
(21) Class, number, and gross tonnage of steel vessels built in the United States and documented during the year ended June 30, 1913.
(22) Class, number, and gross tonnage of vessels built in the United States and documented, 1797–1913.
(23) Number and gross tonnage of vessels built in the United States and documented, 1857–1913.
(24) Class, number, and gross tonnage of metal vessels built in the United States and documented, 1838–1913.
(25) Tonnage of vessels of the United States which have been built, admitted to registry by acts of Congress, etc., and those which have been lost, abandoned, sold to aliens, etc., 1813–1913.
(26) Class, number, and gross tonnange of documented yachts of the United States, by ports, June 30, 1913.
(27) Class, number, and gross tonnage of documented metal yachts of the United States, by ports, June 30, 1913.
(28) Class, number, and gross tonnage of yachts built in the United States and documented during year ended June 30, 1913, by customs districts.
(29) Class, number, and gross tonnage of metal yachts built in the United States and documented during year ended June 30, 1913, by ports.
(30) Class, number, and gross tonnage of documented yachts lost, abandoned, sold to aliens, etc., year ended June 30, 1913.

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REPORT

OF THE

CHIEF OF THE APPOINTMENT DIVISION

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REPORT

OF THE

CHIEF OF THE APPOINTMENT DIVISION.

DEPARTMENT OF COMMERCE,
APPOINTMENT DIVISION,
Washington, October 31, 1913.

SIR: There is submitted herewith my annual report as Chief of the Appointment Division for the fiscal year ended June 30, 1913.

STATISTICS RELATING TO THE PERSONNEL.

The accompanying table shows by bureaus the number of positions in the Department on July 1, 1913, and the increase or decrease in each bureau as compared with August 24, 1912. The status of positions is shown as of August 24, 1912, for the reason that the legislative, executive, and judicial and the sundry civil appropriation acts were not approved until August 23 and 24, respectively. The figures do not include the following employments, appointment to which is not made by the Secretary: Crews on vessels in the Coast and Geodetic Survey, which consisted of 468 employments, 156 of which were filled by persons paid by the insular government of the Philippine Islands; employments of persons engaged in rodding, chaining, recording, heliotroping, etc., in field parties of the Coast and Geodetic Survey, of which there were 1,300; temporary employments in the field operations of the Bureau of Fisheries, of which there were 3,988; mechanics, skilled tradesmen, and laborers to the number of 3,130, employed in the Lighthouse Service, under the authority of Schedule A, Subdivision I, section 12, of the civil-service rules; nor do they include 49 collectors and 7 surveyors of customs, employees of the Treasury Department, employed under various statutes, on work for this Department, in connection with the field work of the Bureau of Navigation. The total miscellaneous employments thus enumerated were 8,942. Information as to the number of deputies, inspectors, and other employees of the Customs Service who are employed in connection with the field work of the Bureau of Navigation and Bureau of Foreign and Domestic Commerce is not available.

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Bureau.	Statutory.	Nonstatutory.	Total.	In District of Columbia.	Outside District of Columbia.	Increase (+) or decrease (−).
Office of the Secretary	[a] 139	.....	139	139	.....	− 19
Bureau of the Census	621	755	1,376	[b] 657	719	+ 41
Bureau of Corporations	63	64	127	[b] 127	.....	− 2
Bureau of Foreign and Domestic Commerce	83	25	108	89	19	+ 13
Bureau of Standards	230	82	[c] 312	272	40	+ 32
Bureau of Fisheries	392	6	398	81	317	+ 1
Bureau of Lighthouses	57	5,567	5,624	41	[d] 5,583	+ [e] 508
Coast and Geodetic Survey	246	101	347	[b] 264	83	+ 3
Bureau of Navigation	40	55	95	29	66	+ 13
Steamboat-Inspection Service	194	68	262	9	253	.....
Total	2,065	6,723	[f] 8,788	1,708	7,080	+ [g] 590

[a] Includes 13 positions transferred to the Department of Labor, Oct. 16, 1913.

[b] Employees engaged in work in the field for a part of each year with headquarters in Washington are treated as within the District of Columbia.

[c] Does not include 5 members of the visiting committee.

[d] Includes the following positions, appointment to which is not made by the head of the Department: 1,575 laborers in charge of post lights, 1,152 members of crews of vessels, and 448 mechanics, skilled tradesmen, and laborers employed in field construction work in the Lighthouse Service and work of a similar character at the General Lighthouse Depot at Tompkinsville, N. Y.

[e] The increase (508) in the Lighthouse Service is due principally to the inclusion of 448 mechanics, skilled tradesmen, and laborers referred to above and not included in the table of positions as of Aug. 24, 1912.

[f] The total number of positions (8,788) shows a decrease of 1,176 as compared with the total of 9,964 shown as of Aug. 24, 1912, in the last annual report. This decrease is accounted for by the transfer on Mar. 4, 1913, and May 1, 1913, by operation of law, of 1,814 positions to the Department of Labor; 1,798 of these positions being embraced in the Bureau of Labor, Bureau of Immigration and Naturalization, and the Children's Bureau, a net increase of 32 positions in these bureaus over the total of 1,766 positions, reported in the last annual report; 16 positions transferred from the Office of the Secretary and shown in the above table as a part of the decrease (see note [g]); and the net increase of 590 positions reported in this table.

[g] Decrease 21, increase 611, leaving a net increase of 590. The main items of decrease are shown in the Office of the Secretary, and are due to the abolishment of 6 positions Sept. 30, 1912, under the provisions of section 8 of the act of Aug. 23, 1912 (work transferred to the Public Printer), and 16 positions transferred May 1, 1913, to the Department of Labor, under the provisions of the act of May 1, 1913. The authorization of 3 new positions effective July 1, 1913, under the provisions of the act of Mar. 4, 1913, makes a net decrease of 19 positions. (One position of clerk at $1,600 per annum which was transferred by the appropriation act of Mar. 4, 1913, from the Bureau of Immigration and Naturalization to the Office of the Secretary, effective July 1, 1913, is not included in the foregoing table, as it was dropped from the Secretary's roll on the same date. This position was included in the total number of positions in the Bureau of Immigration and Naturalization transferred to the Department of Labor under the provisions of the act of Mar. 4, 1913, creating that Department.)

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Classification of Positions, by Bureaus, in the Department of Commerce on July 1, 1913, with Respect to the Civil-Service Act and Rules and Executive Orders.

Bureau.		Classified.								Unclassified.								Total.		Total positions.
		Competitive.		Excepted.				Total.		Presidential.		Special agents, census.		Unskilled laborers, etc.		Total.				
				Presidential.		All others.														
		In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	In D. C.	Outside D. C.	
Office of the Secretary	Statutory	100	.....	.....	.....	3	.....	103	.....	2	.....	.....	.....	34	.....	36	.....	[a]139	.....	139
	Nonstatutory	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bureau of the Census	Statutory	598	.....	.....	.....	.....	.....	598	.....	1	.....	.....	.....	22	.....	23	.....	[b]621	.....	621
	Nonstatutory	9	.....	.....	.....	2	.....	11	.....	.....	.....	[b]25	719	.....	.....	25	719	36	719	755
Bureau of Corporations	Statutory	60	.....	1	.....	1	.....	62	.....	1	.....	.....	.....	.....	.....	1	.....	[b]63	.....	63
	Nonstatutory	61	.....	.....	.....	3	.....	64	.....	.....	.....	.....	.....	.....	.....	.....	.....	[b]64	.....	64
Bureau of Foreign and Domestic Commerce	Statutory	74	.....	.....	.....	1	.....	75	.....	3	.....	.....	.....	5	.....	8	.....	83	.....	83
	Nonstatutory	6	.....	.....	.....	.....	19	6	19	.....	.....	.....	.....	.....	.....	.....	.....	6	19	25
Bureau of Standards	Statutory	218	.....	.....	.....	.....	.....	218	.....	1	.....	.....	.....	11	.....	12	.....	230	.....	[c]230
	Nonstatutory	40	36	.....	.....	.....	.....	40	36	.....	.....	.....	.....	2	4	2	4	42	40	82
Bureau of Fisheries	Statutory	70	272	.....	.....	1	22	71	294	2	.....	.....	.....	6	19	8	19	79	313	392
	Nonstatutory	2	.....	.....	.....	.....	4	2	4	.....	.....	.....	.....	.....	.....	.....	.....	2	4	6
Bureau of Lighthouses	Statutory	36	17	4	.....	.....	.....	40	17	.....	.....	.....	.....	.....	.....	.....	.....	40	17	57
	Nonstatutory	1	[d]2,633	.....	.....	.....	206	1	2,839	.....	.....	.....	.....	.....	[d]2,727	.....	2,727	1	5,566	5,567
Coast and Geodetic Survey	Statutory	241	.....	.....	.....	.....	.....	241	.....	1	.....	.....	.....	4	.....	5	.....	[b]246	.....	246
	Nonstatutory	16	75	.....	.....	.....	8	16	83	.....	.....	.....	.....	2	.....	2	.....	18	83	101
Bureau of Navigation	Statutory	22	12	.....	.....	1	4	23	16	1	.....	.....	.....	.....	.....	1	.....	24	16	40
	Nonstatutory	5	47	.....	.....	.....	3	5	50	.....	.....	.....	.....	.....	.....	.....	.....	5	50	55
Steamboat-Inspection Service	Statutory	8	175	.....	.....	.....	.....	8	175	1	10	.....	.....	.....	.....	1	10	9	185	194
	Nonstatutory	.....	67	.....	.....	.....	1	.....	68	.....	.....	.....	.....	.....	.....	.....	.....	.....	68	68
Total	Statutory	1,427	476	5	.....	7	26	1,439	502	[e]13	10	.....	.....	82	19	95	29	1,534	531	2,065
	Nonstatutory	140	2,858	.....	.....	5	241	145	3,099	.....	.....	25	719	4	2,731	29	3,450	174	6,549	6,723

[a] Includes 13 positions (8 classified competitive and 5 unclassified charwomen) transferred to the Department of Labor, Oct. 16, 1913.
[b] Employees engaged in work in the field for a part of each year, with headquarters in Washington, are treated as within the District of Columbia.
[c] Does not include 5 members of the visiting committee.
[d] Includes the following positions, appointment to which is not made by the head of the Department: (Classified) 448 mechanics, skilled tradesmen, and laborers employed in field construction work in the Lighthouse Service and work of a similar character at the General Lighthouse Depot at Tompkinsville, N. Y.; (unclassified) 1,575 laborers in charge of post lights, and 1,152 members of crews of vessels.
[e] Includes 1 position (Assistant Secretary of the Department of Commerce) actually confirmed by the Senate, although the law does not require such procedure.

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STATISTICS RELATING TO THE PERSONNEL TRANSFERRED TO THE DEPARTMENT OF LABOR.

The following table shows the bureaus and the number of positions in the Department of Commerce and Labor, which were transferred by operation of law (acts approved March 4, 1913, and May 1, 1913) to the Department of Labor. The figures do not include emergency employments, appointment to which is not made by the Secretary, such as guards, interpreters, stenographers, etc., in the field service of the Bureau of Immigration and Naturalization, of which there were 1,029 during the period from July 1, 1912, to the close of February 28, 1913.

Bureau.	Statutory.	Nonstatutory.	Total.	In District of Columbia.	Outside District of Columbia.	Increase (+) or decrease (−).
TRANSFERRED MAR. 4, 1913.						
Bureau of Labor	71	20	[a] 91	[b] 91	.....	− 2
Bureau of Immigration and Naturalization:						
Bureau proper	43	.....	43	43	.....	.....
Division of Information	12	.....	12	12	.....	.....
Division of Naturalization	45	[c] 72	117	45	[d] 72	+10
Immigration Service	.....	1,520	[e] 1,520	[f] 5	[b] 1,515	+24
Children's Bureau	15	.....	15	[b] 15	.....	.....
TRANSFERRED MAY 1, 1913.						
Office of the Secretary	16	.....	[g] 16	16	.....	.....
TRANSFERRED OCT. 16, 1912.						
Office of the Secretary	13	.....	13	13	.....	.....
Total	215	1,612	1,827	240	1,587	[h] +32

[a] Does not include 1 temporary special agent and 1 temporary clerk.
[b] Employees engaged in work in the field for a part of each year with headquarters in Washington are treated as within the District of Columbia.
[c] Includes 4 vacancies; 1 temporary clerk not included.
[d] Includes 2 with headquarters in Washington for local field duty.
[e] Includes 38 vacancies. Does not include 15 temporary employees (job employments) nor 30 positions filled by employees who were connected with other services of the Government and employed occasionally on work for this Department. Does not include 12 employees appointed under the provisions of section 24 of the immigration act of Feb. 20, 1907.
[f] Detailed to the Bureau in accordance with special provisions of law.
[g] Does not include 1 position of clerk at $1,600 per annum. (See note *g*, p. 582.)
[h] Net increase over total for the bureaus on Aug. 24, 1912, shown in last annual report.

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CHANGES IN THE PERSONNEL.

The following table gives a summary of the changes in the personnel of the Department during the fiscal year ended June 30, 1913:

APPOINTMENTS.[a]

Bureau.	Permanent.				Temporary.	Total.
	Competitive.	Excepted.	Unclassified.	Total.		
Office of the Secretary	22	2	11	35	12	47
Bureau of the Census	123	.....	89	212	388	600
Bureau of Corporations	21	4	1	26	5	31
Bureau of Foreign and Domestic Commerce[b]	13	18	4	35	7	42
Bureau of Standards	65	.....	4	69	25	94
Bureau of Fisheries	38	10	16	64	1	65
Bureau of Lighthouses	340	78	1	419	115	534
Coast and Geodetic Survey	51	1	.....	52	54	106
Bureau of Navigation	23	7	.....	30	28	58
Steamboat-Inspection Service	12	.....	1	13	1	14
Total	708	120	127	955	636	1,591

SEPARATIONS AND MISCELLANEOUS CHANGES.

Bureau.	Separations.[c]						Miscellaneous changes.[d]
	From permanent positions.				From temporary positions.	Total.	
	Competitive.	Excepted.	Unclassified.	Total.			
Office of the Secretary	55	2	9	66	12	78	52
Bureau of the Census	77	2	93	172	386	558	588
Bureau of Corporations	19	5	1	25	7	32	53
Bureau of Foreign and Domestic Commerce[b]	21	10	.....	31	5	36	45
Bureau of Standards	69	.....	1	70	22	92	149
Bureau of Fisheries	33	6	23	62	3	65	59
Bureau of Lighthouses	362	38	.....	400	99	499	865
Coast and Geodetic Survey	56	.....	2	58	43	101	157
Bureau of Navigation	11	7	.....	18	27	45	68
Steamboat-Inspection Service	13	.....	1	14	1	15	12
Total	716	70	130	916	605	1,521	2,048

[a] Includes appointments under Executive orders, reinstatements, transfers within the Department, transfers to the Department from other departments or independent establishments, and presidential appointments.

[b] Includes changes in the Bureau of Manufactures and the Bureau of Statistics before their consolidation into the Bureau of Foreign and Domestic Commerce on Aug. 23, 1912.

[c] Includes separations by removals without prejudice or on charges, resignations, deaths, discontinuance of probationary appointees, transfers within the Department or from the Department to other departments or independent establishments.

[d] Includes promotions; reductions; changes of appropriation, designation, name, or station; cancellation of appointment certificates, etc.

The table following gives a summary of the changes in the personnel of the bureaus which were transferred to the Department of Labor in accordance with the provisions of the act of March 4, 1913, for the period from July 1, 1912, to February 28, 1913.

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APPOINTMENTS.[a]

Bureau.	Permanent.				Temporary.	Total.
	Competitive.	Excepted.	Unclassified.	Total.		
Bureau of Immigration	89	29	27	145	67	212
Division of Naturalization	16			16	4	20
Bureau of Labor					12	12
Children's Bureau	16	1	1	18	1	19
Total	121	30	28	179	84	263

SEPARATIONS AND MISCELLANEOUS CHANGES.

Bureau.	Separations.[b]						Miscellaneous changes.[c]
	From permanent positions.				From temporary positions.	Total.	
	Competitive.	Excepted.	Unclassified.	Total.			
Bureau of Immigration	81	36	21	138	53	191	316
Division of Naturalization	12			12	4	16	65
Bureau of Labor	2			2	13	15	21
Children's Bureau	3			3	1	4	
Total	98	36	21	155	71	226	402

[a] Includes appointments under Executive orders, reinstatements, transfers within the Department, transfers to the Department from other departments or independent establishments, and presidential appointments.

[b] Includes separations by removals without prejudice or on charges, resignations, deaths, discontinuance of probationary appointees, transfers within the Department or from the Department to other departments or independent establishments.

[c] Includes promotions; reductions; changes of appropriation, designation, name, or station; cancellation of appointment certificates, etc.

TEMPORARY APPOINTMENTS IN THE BUREAU OF THE CENSUS.

In addition to the regular force provided for the Bureau of the Census in the legislative, executive, and judicial appropriation act approved August 23, 1912, that act authorized the appointment for such time as might be necessary but not beyond June 30, 1913, of not exceeding 175 temporary clerks, from among the employees of the Thirteenth Census force, such clerks to be paid salaries not greater than $900 per annum or on a piece-price basis. For the payment of the compensation of these clerks the sum of $120,000 was appropriated. The limitation placed on the number of temporary clerks thus authorized was removed by a provision in the legislative, executive, and judicial appropriation act approved March 4, 1913, but no additional amount was appropriated. Under this authority the Department increased the number of temporary clerkships to 275. As there were about 3,000 former Thirteenth Census employees who were eligible for appointment to these positions, it was obviously desirable to establish some plan which would properly and economically restrict the selections to a small group of eligibles; and, while not legally necessary, it was also deemed desirable to apportion the appointments as far as practicable among the various States and the

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District of Columbia according to population. With these ends in view, regulations were adopted and action taken as follows:

1. Appointments were apportioned among the States and the District of Columbia according to population, preference being given to those persons who were immediately available (in the District of Columbia or within a radius of 20 miles from the center thereof). In the event any State was unable to supply its quota, selections were made from the State which, in the opinion of the Bureau, furnished the most desirable candidates.

2. Further preference was given those having had sufficient experience in operating tabulating, sorting, or punching machines to make them familiar with such work.

3. In general, those having had the highest efficiency ratings during their Thirteenth Census employment were given preference subordinate to that given in regulations 1 and 2.

4. Entrance salary was fixed at $720 per annum, without promise of promotion.

5. Leave regulations were the same as for the Thirteenth Census force, namely, annual and sick leave accrued at the rate of two and one-half days a month, all sick leave to be supported by a doctor's certificate.

6. Appointments contained a clause limiting service to June 30, 1913, and to be subject to termination at any time.

PRESIDENTIAL POSITIONS.

The following table shows the presidential positions in the Department on July 1, 1913, the tenure of all being indefinite. Those marked with an asterisk (*) do not require confirmation by the Senate. There has been a reduction of 18 presidential positions during the year, this reduction being caused by the transfer of 10 positions to the Department of Labor and by a change in the manner of making appointment to 8 in the Alaska service of the Bureau of Fisheries. These positions are shown in subsequent tables.

Position.	Compensation.	Authority.
Secretary of Commerce	$12,000	32 Stat., 825.
*Assistant Secretary of Commerce	5,000	Do.
Director of the Census	6,000	32 Stat., 51.
*Commissioner of Corporations	5,000	32 Stat., 827.
Deputy Commissioner of Corporations	3,500	Do.
Chief of Bureau of Foreign and Domestic Commerce	4,000	Act Aug. 23, 1912.
Assistant Chief of Bureau of Foreign and Domestic Commerce	3,000	Do.
Do	2,750	Do.
Director of the Bureau of Standards	6,000	31 Stat., 1449.
Commissioner of Fish and Fisheries	6,000	25 Stat., 1.
Deputy Commissioner of Fisheries	3,500	32 Stat., 1102.
*Commissioner of Lighthouses	5,000	36 Stat., 827.
*Deputy Commissioner of Lighthouses	4,000	Do.
*Chief Constructing Engineer, Bureau of Lighthouses	4,000	Do.
*Superintendent of Naval Construction, Bureau of Lighthouses	3,000	Do.
Superintendent of the Coast and Geodetic Survey	6,000	25 Stat., 949.
Commissioner of Navigation	4,000	23 Stat., 118.
Supervising Inspector General, Steamboat-Inspection Service	4,000	R. S., 4402.
Ten supervising inspectors of steam vessels (with headquarters at San Francisco, Cal.; New York, N. Y.; Norfolk, Va.; St. Louis, Mo.; Boston, Mass.; Louisville, Ky.; Pittsburgh, Pa.; Detroit, Mich.; Cleveland, Ohio; and New Orleans, La.), each.	3,000	R. S., 4404.

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The following presidential positions were transferred to the Department of Labor, effective March 4, 1913, by the act approved March 4, 1913, creating that Department:

Position.	Compensation.	Tenure.	Authority.
Commissioner of Labor Statistics	$5,000	Term of 4 years unless sooner removed.	25 Stat., 182.
Commissioner General of Immigration	5,000	Indefinite...	28 Stat., 780.
Commissioner of immigration at the port of—			
New York, N. Y.	6,500	Term of 4 years unless sooner removed and until successor is appointed.	28 Stat., 891.
Baltimore, Md.	4,000	....do.....	Do.
Boston, Mass.	4,000	....do.....	Do.
Philadelphia, Pa.	4,000	....do.....	Do.
San Francisco, Cal.	4,000	....do.....	Do.
San Juan, P. R.	3,600	....do.....	Do.
Seattle, Wash.	4,000	....do.....	Do.
Chief of the Children's Bureau	5,000	Indefinite...	Act Apr. 9, 1912.

The sundry civil appropriation act approved June 23, 1913, provides that appointments to the following-named positions, the tenure of which is indefinite, theretofore made by the President and confirmed by the Senate, be made by the Secretary of Commerce:

Position.	Compensation.	Authority.
Agent, Alaska salmon fisheries	$2,500	33 Stat., 478.
Assistant agent, Alaska salmon fisheries	2,000	Do.
Do	1,800	36 Stat., 1439.
Warden, Alaska service	1,200	Do.
Deputy warden, Alaska service	a 900	Do.
Do	a 900	Do.
Do	a 900	Do.
Do	a 900	Do.

a The compensation of these positions was increased from $600 to $900 per annum, effective July 1, 1913.

CREATION OF THE BUREAU OF FOREIGN AND DOMESTIC COMMERCE.

The act making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ended June 30, 1913, approved August 23, 1912, consolidated the Bureau of Manufactures and the Bureau of Statistics into a bureau to be known as the Bureau of Foreign and Domestic Commerce. The title of the new bureau is an appropriate one and should in itself serve to bring the activities and possibilities of this service to the attention of the industrial and commercial interests of the United States.

The positions authorized for the Bureau of Foreign and Domestic Commerce, as compared with those provided for the Bureaus of Manufactures and Statistics for the preceding fiscal year, as well as the increases and decreases in the various classes of positions, are shown in the following table:

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Position.	Bureau of Foreign and Domestic Commerce.		Bureau of Manufactures.		Bureau of Statistics.		Increase.		Decrease.	
	No.	Salary.	No.	Salary.	No.	Salary.	No.	Salary.	No.	Salary.
Chief of Bureau	1	$4,000	1	$4,000	1	$4,000	....	....	1	$4,000
Assistant Chief of Bureau	1	3,000	....	....	....	....	1	$3,000	....	....
Do	1	2,750	....	....	....	....	1	2,750	....	....
Do	....	....	1	2,500	....	....	....	....	1	2,500
Chief of Division of Consular Reports	1	2,500	....	....	....	....	1	2,500	....	....
Chief of Division	....	....	1	2,100	....	....	....	....	1	2,100
Do	....	....	....	....	1	2,000	....	....	1	2,000
Chief Clerk	1	2,250	....	....	1	2,250	....	....	....	....
Stenographer to Chief of Bureau	1	1,600	1	1,600	....	....	....	....	....	....
Clerks, class 4	7	1,800	2	1,800	5	1,800	....	....	....	....
Clerks, class 3	5	1,600	2	1,600	5	1,600	....	....	2	1,600
Clerk	1	1,500	....	....	1	1,500	....	....	....	....
Clerks, class 2	11	1,400	3	1,400	9	1,400	....	....	1	1,400
Clerks, class 1	14	1,200	4	1,200	11	1,200	....	....	1	1,200
Clerks	17	1,000	4	1,000	13	1,000	....	....	....	....
Do	11	900	5	900	6	900	....	....	....	....
Messenger	1	840	....	....	1	840	....	....	....	....
Assistant messengers	5	720	2	720	1	720	2	720	....	....
Laborers	4	660	1	660	1	660	2	660	....	....
Laborer	1	480	....	....	1	480	....	....	....	....
Total	83	104,860	27	36,600	57	73,650	7	11,010	[a] 8	[b] 16,400

[a] Net decrease of 1.

[b] Net decrease of $5,390.

In addition to the reduction of $5,390 in the appropriation for the statutory force, indicated above, the $4,000 appropriation for the collection of facts relating to the internal and foreign commerce of the United States, under which one chief of division at $2,500 per annum and one clerk at $1,200 per annum had been employed in the Bureau of Statistics, was not provided for after August 23, 1912. Thus the total reduction in expenditures for salaries was $9,090.

In view of the reduction in the number of positions in the higher classes, it was necessary to make a readjustment of the forces of the two bureaus, which resulted in the appointment of one chief of division as commercial agent, the demotion of one chief of division and 19 clerks, and the transfer of three clerks to the Bureau of the Census.

TRANSFER OF CERTAIN WORK TO THE PUBLIC PRINTER.

Section 8 of the legislative, executive, and judicial appropriation act approved August 23, 1912, provided, among other things, that no money appropriated by that or any other act should be used on or after October 1, 1912, for services in any executive department at Washington, D. C., in the work of addressing, wrapping, mailing, or otherwise dispatching any publication for public distribution, except maps, weather reports, weather cards, orders, instructions, directions, notices, and circulars of information; and that on and after October 1, 1912, it should be the duty of the Public Printer to perform such work at the Government Printing Office. The act also provides:

> The employment of all persons in the several executive departments and other Government establishments at Washington, District of Columbia, wholly in connection with the duties herein transferred to the Public Printer, or whose

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services can be dispensed with or devolved upon another because of such transfer, shall cease and determine on or before the first day of October, nineteen hundred and twelve, and their salaries or compensation shall lapse for the remainder of the fiscal year nineteen hundred and thirteen and be covered into the Treasury.

In compliance with these provisions, six positions in the Office of the Secretary and one in the Bureau of the Census were abolished at the close of September 30, 1912. The positions in the Office of the Secretary included one clerk at $1,000 per annum, who was transferred to another position; an assistant messenger, who was transferred to a position in the Bureau of Fisheries; and one laborer at $660 per annum and three laborers at $480 per annum each, who were transferred to the Government Printing Office.

IMPORTANT CHANGES IN LAWS RELATING TO THE EXECUTIVE CIVIL SERVICE.

During the past fiscal year a number of important provisions affecting the executive civil service were enacted into law, among which were the following:

Efficiency ratings for classified service and preference in reduction of force.—Section 4 of the legislative, executive, and judicial appropriation act approved August 23, 1912, provided:

The Civil Service Commission shall, subject to the approval of the President, establish a system of efficiency ratings for the classified service in the several executive departments in the District of Columbia based upon records kept in each department and independent establishment with such frequency as to make them as nearly as possible records of fact. Such system shall provide a minimum rating of efficiency which must be attained by an employee before he may be promoted; it shall also provide a rating below which no employee may fall without being demoted; it shall further provide for a rating below which no employee may fall without being dismissed for inefficiency. All promotions, demotions, or dismissals shall be governed by provisions of the civil service rules. Copies of all records of efficiency shall be furnished by the departments and independent establishments to the Civil Service Commission for record in accordance with the provisions of this section: *Provided*, That in the event of reductions being made in the force in any of the executive departments no honorably discharged soldier or sailor whose record in said department is rated good shall be discharged or dropped, or reduced in rank or salary.

Any person knowingly violating the provisions of this section shall be summarily removed from office, and may also upon conviction thereof be punished by a fine of not more than one thousand dollars or by imprisonment for not more than one year.

The system of efficiency ratings thus provided for has not yet been established by the Commission. With reference to the proviso in favor of honorably discharged soldiers and sailors, in the event of reductions in the force, the Attorney General has advised this Department in an opinion dated June 2, 1913, as follows:

The proviso only undertakes to protect honorably discharged soldiers or sailors, whose departmental record is good, from being discharged or dropped, or reduced in rank or salary, "in the event of reductons being made in the force in any of the executive departments." It says, in substance, that any such reduction in the force of a department shall not be at the expense of any honorably discharged soldier or sailor, if his record in said department be good. But it does not prohibit the head of a department from conforming the salary of an honorably discharged soldier or sailor to the grade or character of work he may be called upon to perform.

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Certification for certain positions in the Bureau of the Census.—In the act above referred to, under the heading "Census Office," there is the following provision:

In certifying eligibles from the civil-service registers for the purpose of appointment to positions of clerkships in the Census Office hereinbefore provided for at salaries of $1,200 or less, the Civil Service Commission shall, so far as practicable under the law of apportionment, certify those who have had at least one year's experience in census work.

Under this provision 44 clerks with former census experience have, since the passage of the act and to the close of the fiscal year, been certified by the Commission and appointed to permanent positions.

Lump-sum appropriations not to be used to increase salaries except as specified.—In the act last referred to it is provided in section 3:

That no part of any money appropriated in lump sum in this Act shall be available for the payment of personal services at a rate of compensation in excess of that paid for the same or similar services during the fiscal year nineteen hundred and twelve; nor shall any person employed at a specific salary under this Act be transferred during the fiscal year nineteen hundred and thirteen and be paid from a lump-sum appropriation a rate of compensation greater than such specific salary and the heads of departments shall cause this provision to be enforced.

Section 7 of the deficiency appropriation act approved August 26, 1912, provides:

No part of any money contained herein or hereafter appropriated in lump sum shall be available for the payment of personal services at a rate of compensation in excess of that paid for the same or similar services during the fiscal year nineteen hundred and twelve; nor shall any person employed at a specific salary be hereafter transferred and hereafter paid from a lump-sum appropriation a rate of compensation greater than such specific salary, and the heads of departments shall cause this provision to be enforced.

Section 4 of the legislative, executive, and judicial appropriation act approved March 4, 1913, provides:

That section seven of the general deficiency appropriation Act approved August twenty-sixth, nineteen hundred and twelve, is amended to read as follows:

"SEC. 7. That no part of any money contained herein or hereafter appropriated in lump sum shall be available for the payment of personal services at a rate of compensation in excess of that paid for the same or similar services during the preceding fiscal year; nor shall any person employed at a specific salary be hereafter transferred and hereafter paid from a lump-sum appropriation a rate of compensation greater than such specific salary, and the heads of departments shall cause this provision to be enforced: *Provided*, That this section shall not apply to mechanics, artisans, their helpers and assistants, laborers, or any other employees whose duties are of similar character and required in carrying on the various manufacturing or constructing operations of the Government."

A number of important decisions, referred to in another part of this report, have been rendered by the Comptroller of the Treasury in regard to the effect of these provisions of law.

Section 5 of the legislative, executive, and judicial appropriation act approved August 23, 1912, provides:

That any person violating section four of the legislative, executive, and judicial appropriation Act approved August fifth, eighteen hundred and eighty-two (Statutes at Large, volume twenty-two, page two hundred and fifty-five), shall be summarily removed from office, and may also upon conviction thereof be punished by a fine of not more than one thousand dollars or by imprisonment for not more than one year.

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Section 4 of the act of August 5, 1882, above referred to, reads as follows:

That no civil officer, clerk, draughtsman, copyist, messenger, assistant messenger, mechanic, watchman, laborer, or other employee shall * * * be employed in any of the executive departments, or subordinate bureaus or offices thereof at the seat of government, except only at such rates and in such numbers, respectively, as may be specifically appropriated for by Congress for such clerical and other personal services for each fiscal year; and no civil officer, clerk, draughtsman, copyist, messenger, assistant messenger, mechanic, watchman, laborer, or other employee shall hereafter be employed at the seat of government in any executive department or subordinate bureau or office thereof or be paid from any appropriation made for contingent expenses, or for any specific or general purpose, unless such employment is authorized and payment therefor specifically provided in the law granting the appropriation, and then only for services actually rendered in connection with and for the purposes of the appropriation from which payment is made, and at the rate of compensation usual and proper for such services, * * * all details of civil officers, clerks, or other subordinate employees from places outside of the District of Columbia, for duty within the District of Columbia, except temporary details for duty connected with their respective offices, be, and are hereby, prohibited.

Removals and right of petition.—Section 6 of the post office appropriation act approved August 24, 1912, provides:

That no person in the classified civil service of the United States shall be removed therefrom except for such cause as will promote the efficiency of said service and for reasons given in writing, and the person whose removal is sought shall have notice of the same and of any charges preferred against him, and be furnished with a copy thereof, and also be allowed a reasonable time for personally answering the same in writing; and affidavits in support thereof; but no examination of witnesses nor any trial or hearing shall be required except in the discretion of the officer making the removal; and copies of charges, notice of hearing, answer, reasons for removal, and of the order of removal shall be made a part of the records of the proper department or office, as shall also the reasons for reduction in rank or compensation; and copies of the same shall be furnished to the person affected upon request, and the Civil Service Commission also shall, upon request, be furnished copies of the same: *Provided, however*, That * * * The right of persons employed in the civil service of the United States, either individually or collectively, to petition Congress, or any Member thereof, or to furnish information to either House of Congress, or to any committee or Member thereof, shall not be denied or interfered with.

Shortly after this act was approved the Department requested the views of the Civil Service Commission relative to the effect of this section on certain provisions of the civil-service rules. The points raised, and the Commission's views thereon, are embodied in a circular which the Commission issued in April last and which reads, in part, as follows:

Removal of probationers.—It is clear that the rules do not contemplate the continuance through a period of probation of any appointee found guilty of any of the charges thus described, and that when a probationer has served sufficiently long to satisfy the appointing officer that he is inefficient or incapable and that the public service would be materially improved by his removal his service should terminate. The Commission holds that the probationary period required by law preliminary to permanent appointment is an essential part of the examination held to ascertain the fitness of applicants. The prescribed period of service being regarded as probationary, section 6 of the act of August 24, 1912, is not regarded as applying to probationers. The existing practice under section 1 of Rule VII is not changed by the act, and a probationer may be separated from the service at any time during or at the expiration of the probationary period without further formality than a written notification setting forth the reasons in full.

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Removal of temporary appointees.—In the removal of temporary appointees the Commission holds that the law did not contemplate its application to temporary employment, and therefore the procedure required by the law need not be observed as to this class of employees.

Removal from excepted positions.—The classified service comprises all those positions which, on the one hand, are not subject to confirmation by the Senate and, on the other hand, are not those of mere laborer or workman. Positions excepted from examination under Schedule A of the rules are therefore within the classified service, and section 6 of the act of August 24, 1912, as it applies in direct terms to all classified employees, applies to persons occupying positions excepted from examination under Schedule A. (This view is not concurred in by the Attorney General, as shown on page 606 of this report, and the Civil Service Commission has subsequently receded from the position taken by it as indicated above.)

Suspension.—The act is not regarded as applying to cases of suspension. Where the person is later dropped from the classified service, then it is necessary to comply with the requirements of the act. Under Rule XII, section 3, a person may be suspended or temporarily removed for a period not exceeding 90 days, either pending removal or for disciplinary reasons, the reasons for such disciplinary suspension or temporary removal to be furnished the employee and filed. The provisions of the rule as to the suspension of employees are not inconsistent with the act.

Answer of employee.—The words in the statute "affidavits in support thereof" are regarded as applying to the answer of the accused employee.

EFFICIENCY RECORDS.

The first step toward securing efficiency records in the Department was taken in March, 1906, when the Civil Service Commission, by direction of the President, attempted to secure from every executive department and independent establishment full lists of all superannuated employees, with information as to their efficiency ratings and how many of them were veterans. These lists, with the ratings, were obtained from all of the bureaus of this Department and promptly transmitted to the Civil Service Commission. Later in the year the Department decided to obtain the same information in regard to the efficiency of all of its officers and employees below the presidential class, regardless of the military or naval feature involved in the previous investigation. The ratings thus obtained were used to a considerable extent in considering recommendations for promotion. In each of the investigations made in 1906 the efficiency records were based solely upon the judgment and statements of the reporting officers.

The second investigation into the efficiency of the personnel of the Department was conducted in the summer of 1909. In all, 7,119 employees were reported upon. The result of the investigation is shown in the annual report of this Division for 1910.

The third (and last) investigation was conducted during the summer of 1911. The judgment, not only of the chief but also of the subordinate officer under whom the person was actually employed, was obtained, and both of these officers were required to sign the report. The annual report of the Division for the fiscal year ended June 30, 1912, shows the action taken by the Department with regard to these reports.

The efficiency ratings established by the investigations of 1909 and 1911 were consulted whenever recommendations for promotions were

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received, and if it appeared that employees not having the highest ratings were recommended for advancement the bureau officers were called upon for a statement of the reasons for the action proposed. Efficiency records are now kept independently by several bureaus of the Department, namely, the Bureau of the Census, the Bureau of Standards, the Bureau of Fisheries, the Bureau of Lighthouses, and the Coast and Geodetic Survey.

By section 4 of the act approved August 23, 1912 (legislative, etc., appropriation act for the fiscal year 1913), which has been previously quoted in this report, Congress has by implication apparently taken out of the hands of the several executive departments the work of maintaining efficiency records for the classified service (at least in the District of Columbia).

The section will involve the Commission in much additional labor. Up to the present time no efficiency records have been established by the Commission, and this Department has not been requested to cooperate in carrying out the apparent intention of the law. On March 4, 1913 (legislative, etc., appropriation act for the fiscal year 1914), Congress made an appropriation "for the establishment and maintenance of system of efficiency ratings for initial year, $15,000, to be immediately available," and it is understood that two persons have been appointed to consider the preliminary arrangements. As it is provided that the Commission shall investigate and report to the President, with its recommendations, as to the administrative needs of the service relating to personnel in the several executive departments and independent establishments in the District of Columbia, and report to Congress details of expenditure and of progress of work at the beginning of each regular session, it did not appear entirely feasible or desirable to make a separate investigation into the efficiency of employees of this Department immediately prior to that to be made by the Commission. For the present purposes of the Department the latest efficiency records, compiled in the summer of 1911, are used as the basis for promotions, care being taken to see that any changed conditions in the personnel caused by the lapse of time are taken into account. In my judgment, the Department should see that in every case the person promoted is, of the class in which he is employed, the most entitled to advancement, and if the latest efficiency records do not indicate such excellence of efficiency the bureau officer should be called upon to furnish an explanation which will justify the Department in accepting a recommendation for advancement.

PROMOTIONS.

When for any cause a vacancy occurs in the personnel, it has been the policy of the Department, so far as possible, to fill the place by promoting an employee from the next class below and in turn fill the position thus vacated from the next lower class. The lowest class, if not filled by transfer, is filled by selection from the civil-service registers. It is desirable that this policy of filling vacancies by promotion instead of by transfer from other departments or by original appointment be continued, save in exceptional cases, for the reason that it will inspire the working force with the sense that their interests are considered a definite part of the work of the

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Department, and assure them that by faithful service they will be given fair consideration in connection with such opportunities for advancement as may occur.

During the year the Chief Clerk and Superintendent (of Buildings) of the Department resigned and, in keeping with the policy outlined, the vacancy was filled by the promotion of one of the division chiefs in the Office of the Secretary, and the resulting vacancies down to the lowest class were similarly filled. A deputy chief of a bureau was appointed as head of a bureau in which a vacancy occurred and a local inspector of boilers was appointed as supervising inspector of a district in the Steamboat-Inspection Service, both of the vacancies being in presidential grades. The selection of persons from the ranks for appointment to higher positions inspires employees in the lower grades to give at all times their best efforts, and in that way efficiency in the Government service is promoted.

LAW OF APPORTIONMENT.

In the early part of this year the President's Commission on Economy and Efficiency submitted to the President a special report on the apportionment of appointments in the departments at Washington as provided for in the following provision of section 2, of the civil-service act of January 16, 1883:

> Appointments to the public service * * * in the departments at Washington shall be apportioned among the several States and Territories and the District of Columbia upon the basis of population as ascertained at the last preceding census.

The same section of the act also provides that appointments are to be so apportioned "as nearly as the conditions of good administration will warrant."

The President's Commission objects not so much to the law itself as it does to its interpretation and application by the Civil Service Commission. The following statement is made on page 9 of its report to the President:

> After an exhaustive study of the records of the Civil Service Commission and of the evidence which was obtained from the departments * * *, the President's Commission has come to the conclusion that the interpretation which has been given to the act by the Civil Service Commission has been such as practically to defeat its primary purpose; that instead of giving to applicants the benefit of competitive examinations, and instead of giving to the service the benefit of rules adopted for "testing the fitness of applicants"; instead of making available to the Government persons who had by the rules established been given a rating of superior merit, every "condition of good administration" has been made subordinate and subservient to demands that can find no explanation except a desire to continue a system which the law was designed to supplant. Practically the only effect of the law as interpreted had been to eliminate from the possibility of appointment to positions in the classified service such persons as had entirely failed to obtain any standing whatever, i. e., to obtain an average above the passing mark.

It is conceded that for many reasons it is desirable to have employees of the civil branch of the Government represent the various States and sections of the country, but it is doubtful whether such a policy, however desirable, is of sufficient importance to outweigh the tests which are now provided to determine the merit and qualifications of applicants for the service. In any event, it has been found

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to be impossible, notwithstanding the efforts of the Civil Service Commission, to maintain even an approximate equilibrium between the number of appointments to which the States are entitled and those which they actually receive.

If the provision of law requiring the apportionment of appointments is to remain on the statute books, I concur in the view expressed by the President's Commission that it should be regarded as being only coordinate with the provisions contained in the same section of the civil-service act which requires that selections shall be made "according to grade from among those graded highest as the results of * * * competitive examinations." Either the repeal of the law requiring the apportionment of appointments, or its subordination to that providing for the selection of persons from among those graded highest in open competitive examinations, would result in the vitalization of the whole civil-service system. It certainly is not in the interests of good administration to require an appointing officer to make a selection from a certificate of eligibles with comparatively low ratings, say from 70 to 75, when there are eligibles on the register with ratings from 5 to 10 points higher. The table on page 22 of the report of the President's Commission shows that during the year 1910 the ratings of the eligibles certified to all departments for the position of clerk averaged 8.45 points lower than the ratings of other eligibles on the register who were not certified because they were from States which had already exceeded their share of appointments under the law of apportionment. In some instances there was a difference of 14 and 15 points in the ratings of the eligibles certified and those withheld from certification.

With a view to deferring the certification of eligibles with very low ratings until practically all those with better ratings had been certified, the Civil Service Commission, on May 14, 1910, established the following method of certification for scientific, technical, and professional positions:

Dividing the States and Territories into two groups, the first group constituted of those that have not received their proportionate share of appointments and the second group of those that have received more than their proportionate share, certification is made in the following order:

(1) All eligibles in order of average percentage from the whole group of States in arrears with averages down to and including 75;

(2) In like manner from the whole group of States in excess except the last two States (Virginia and Maryland) and the District of Columbia;

(3) From the whole group of States in arrears down to and including 73;

(4) In like manner as in (2) down to and including 73;

(5) All remaining eligibles in order of average percentage from the whole group of States in arrears;

(6) The same as (2) and (4) of all remaining eligibles;

(7) In order of their standing under the apportionment from the last two States and the District of Columbia.

On October 18, 1911, this method of certification was extended to cover the position of stenographer and typewriter paying more than $900 per annum, and on January 28, 1913, it was further extended to cover all positions in the apportioned service. This will undoubtedly result in the certification of better qualified eligibles, but it would unquestionably be much more satisfactory if eligibles claiming legal residence in Virginia, Maryland, and the District of Columbia were certified in the same groups as those claiming residence in other States which have received more than their proportionate share of appoint-

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ments. It seems doubtful whether it is in the interests of good administration to withhold from certification the names of eligibles from Virginia, Maryland, and the District of Columbia, where many of the best qualified eligibles are found, until the names of those from all other States have been removed from the register.

The law of apportionment also applies to all transfers from the nonapportioned to the apportioned service, whether intradepartmental or interdepartmental. In a number of instances the Department has been inconvenienced because the Civil Service Commission has not felt at liberty to authorize transfers from the nonapportioned to the apportioned service on the ground that the persons whose transfers were requested were residents of States or Territories which had received an excessive share of appointments. Under the provisions of clause (*c*), section 8, of civil-service Rule X, the Commission has authority to waive the apportionment upon the certificate of the appointing officer that the transfer requested is in the interest of good administration, and setting forth in detail the reasons therefor. It is believed that the appointing officer should be the sole judge as to the qualifications of a person whom he desires to transfer to his department, and that a certificate to the effect that the transfer is in the interest of good administration should be accepted as sufficient ground for action.

SUPERANNUATION AND RETIREMENT.

The problem of utilizing the services of aged employees to the best advantage is constantly becoming more difficult of solution. The growing volume of work, the demand for increased efficiency, and the introduction of new methods and ideas require the services of men and women whose minds are active and capable of development. It seems inconsistent that the Government should expend large sums of money in attempting to procure properly equipped eligibles to enter its employ and at the same time retain on its rolls those who have passed their period of usefulness. The heads of departments are reluctant to discontinue the services of superannuated clerks, for to do so would in most cases deprive them of their only means of livelihood. It would therefore seem to be only just and proper to provide for the retirement of such employees on annuities at least partly commensurate with the rates of pay which they have been receiving.

An incident which occurred recently in one of the bureaus of the Department serves to illustrate the need of a system of retirement. Owing to the largely technical nature of the work of this bureau, and in order to provide for new positions of the kind required, several positions occupied by superannuated employees were abolished through the current appropriation act. As this necessitated their discontinuance the only alternative offered was that an effort be made to provide for them among other bureaus of the Department. Although the bureaus recommend as a rule the filling of vacancies by the appointment of younger persons well qualified as stenographers and typewriters, statistical clerks, editorial clerks, etc., it was found that all were willing to give these aged clerks every consideration upon the occurrence of vacancies in the lower grades, and at the close of the year six clerks, whose services would otherwise have been discontinued, had been provided for by transfer. The employees affected had devoted years of satisfactory service in the

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employ of the Government and retirement with pension would have offered a happier solution of the problem. Should a plan for the retirement of this class of employees be put into effect the bureaus and offices of the Department would undoubtedly recommend the discontinuance of superfluous positions which are at present occupied by superannuated clerks retained in office for humanitarian reasons only.

That the subject of retirement is receiving the attention of Congress is evidenced by a number of bills which have been introduced during the past few months. It is hoped that the enactment of suitable legislation to provide for the retirement of superannuated employees will not longer be deferred, for the practice of carrying such employees on the rolls after their services have ceased to be of value will result, if continued indefinitely, in lowering the high standard of efficiency maintained at present.

DETAIL OF EMPLOYEES.

As shown in the following table, 73 employees of the Department were on detail within the District of Columbia at various times during the past fiscal year. One of them was on detail during the entire fiscal year. The table does not include intradetails between the divisions and stations of the different bureaus nor other miscellaneous details, such as loans to the White House, committees in Congress, etc.

Bureau.	Detailed from.[a]		Detailed to.[a]		Net loss.		Net gain.	
	Persons.	Days.	Persons.	Days.	Persons.	Days.	Persons.	Days.
Office of the Secretary:								
Office proper			3	218			3	218
Office of the Chief Clerk	4	189	1	9	3	180		
Disbursing Office			7	807			7	807
Appointment Division	1	217	3	236			2	19
Division of Supplies			1	17			1	17
Division of Publications			8	780			8	780
Bureau of the Census	21	1,439	8	701	13	738		
Bureau of Immigration and Naturalization	5	579			5	579		
Division of Naturalization	1	24	18	1,676			17	1,652
Bureau of Corporations	29	1,888	1	30	28	1,858		
Bureau of Labor								
Children's Bureau	4	161	4	82		79		
Bureau of Foreign and Domestic Commerce	2	39	10	[b] 337			8	298
Bureau of Standards			1	21			1	21
Bureau of Fisheries	5	609			5	609		
Bureau of Lighthouses	1	184			1	184		
Coast and Geodetic Survey			2	122			2	122
Bureau of Navigation			5	243			5	243
Steamboat-Inspection Service			1	50			1	50
Total	73	5,329	73	5,329	55	4,227	55	4,227

[a] In cases where the same person was detailed more than once, but not continuously, each detail is counted as being of a separate person.

[b] Includes details to the Bureaus of Manufactures and Statistics before consolidation into the Bureau of Foreign and Domestic Commerce.

LEAVES OF ABSENCE.

During the past fiscal year the Department approved special leave regulations for the following classes of employees in the Lighthouse Service, namely, (1) keepers, (2) officers and members of crews of light vessels, and (3) members of crews of tenders. Special leave regulations for these classes of employees were deemed necessary because of conditions peculiar to their employment and in order to se-

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cure uniformity in the various districts. In the regulations governing shore liberty and leave of absence for keepers, approved by the Department under date of July 9, 1912, it is recognized that employment in some light stations is more desirable than in others. The amount of leave that may be granted in any one calendar year varies from 30 days at the more desirable stations to 72 days at those that are less desirable. The regulations were amended by the Department under date of May 27, 1913, so that the leave for the keepers at certain unusually remote stations in Alaska may be allowed to accrue for three years, the same to be granted during the fourth year. The regulations governing shore liberty for officers and members of crews of light vessels, approved by the Department under date of July 9, 1912, provide for a maximum of 90 days per annum, all time away from the vessel being counted, except that at the more remote offshore vessels not to exceed one day may be allowed for transit each way. The regulations governing leaves of absence for members of crews of tenders were approved by the Department under date of December 18, 1912, and limit the amount of leave that may be granted to 10 days in any one calendar year, not inclusive of short periods of shore liberty not exceeding 24 hours, with the proviso that the employee shall have served at least six months immediately preceding the request for such leave.

In continuation of the Department's past practice, a list was prepared showing the names of the employees of the Department in the District of Columbia who took all, or practically all, of their annual and sick leave for the past three calendar years, namely, 1910, 1911, and 1912. The list included the names of 23 employees, a decrease of 3 from the list prepared for the years 1909, 1910, and 1911. After investigation the bureaus in which these employees were stationed reported that the cases were exceptional and that they did not then feel justified in recommending any disciplinary action, which reports were concurred in by the Department.

The following table shows by bureaus the average amount of annual and sick leave, stated separately and together, taken by the employees of the Department in the District of Columbia during the calendar year 1912. In the compilation of this table only those employees were considered who served the entire year and were, therefore, subject to the full allowance of 30 days of both annual and sick leave.

Bureau.	Employees considered.	Annual.	Sick.	Total.
		Days.	*Days.*	*Days.*
Office of the Secretary	131	26.53	5.87	32.40
Bureau of the Census	536	28.18	6.85	35.03
Bureau of Immigration and Naturalization	54	28.02	4.15	32.17
Division of Naturalization	43	28.16	4.07	32.23
Bureau of Corporations	114	28.35	5.45	33.80
Bureau of Labor	85	27.16	6.81	33.97
Children's Bureau	8	26.75	4.13	30.88
Bureau of Foreign and Domestic Commerce	81	28.57	4.41	32.98
Bureau of Standards	182	26.74	3.23	29.97
Bureau of Fisheries	71	26.56	5.82	32.38
Bureau of Lighthouses	35	28.34	7.81	36.15
Coast and Geodetic Survey	177	28.66	5.88	34.54
Bureau of Navigation	20	25.60	3.13	28.73
Steamboat-Inspection Service	8	28.75	6.56	35.31
General average	1,545	27.60	5.30	32.90

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Compared with the table prepared for the calendar year 1911, the above table shows a net increase of 0.11 day of annual leave and a net decrease of 0.58 day of sick leave, thus making a total net decrease of 0.47 day.

TEMPORARY APPOINTMENTS.

Temporary appointments are of two general classes, (1) those pending the filling of positions permanently, and (2) those for particular jobs of work, at the completion of which the services of the employees are no longer required. The procedure in making such appointments accords with the civil-service rules, and conforms, as far as practicable, to that followed in filling permanent positions. Realizing that the privilege of making temporary appointments is liable to abuse, the Department has made such appointments only when it was clear that they were not only in the interests of the service but necessary to good administration. The majority of them are made in the services outside of Washington, D. C., and since the transfer of the Bureau of Immigration and Naturalization to the Department of Labor, the total number has been greatly reduced, most of them now being in the Lighthouse Service.

GROWTH OF THE RADIO SERVICE OF THE BUREAU OF NAVIGATION.

During the year the personnel of the Radio Service of the Bureau of Navigation was increased from 4 radio inspectors, appointed prior to July 1, 1912, to 25 employees, consisting of 1 radio engineer, 11 radio inspectors, and 13 clerks. This increase was made necessary by the acts of July 23 and August 13, 1912, which materially widened the scope of the Service. The establishment of headquarters by the radio inspectors in various cities of the United States necessarily required the appointment of stenographers and typewriters or clerks for the performance of the clerical duties which naturally arose in connection with the maintenance of such offices. Of the 13 clerks referred to, 3 were appointed permanently and 10 temporarily.

INDISCRIMINATE ASSIGNMENTS TO DUTY.

Recently information reached the Department which seemed to indicate that in certain instances clerks qualified as stenographers and typewriters were assigned to clerical and other duties not in line with their experience and training. Indiscriminate assignments of this kind are objectionable not only to the employees who are deprived of an opportunity of making use of their special training and fitness, but also to the Department, for administrative reasons, and to the Civil Service Commission, which experiences difficulty in obtaining a sufficient number of eligibles for filling positions which require appointees with such qualifications. With a view to determining to what extent, if any, employees of this class were improperly assigned, the Department addressed a circular letter to each of its various bureaus asking for a report and stating in part, as follows:

In this connection attention is invited to the Department's letters of February 4, 1907, March 16, 1908, and January 10, 1911, inclosing copies of letters from the Civil Service Commission relative to the desirability of making selec-

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tions from other than the stenographer and typewriter register when stenographer and typewriter qualifications are not absolutely necessary in order to make the most advantageous use of positions. It is the policy of the Department to refrain from assigning stenographers and typewriters to duties not in line with their training and experience; and, as heretofore stated, it is the Department's desire that the various bureaus cooperate with the Commission as much as possible in the matter of certifications for filling positions of a "purely clerical or quasi-clerical character."

It appeared from the reports submitted that employees who were appointed from the stenographer and typewriter register were given as much work as possible along the line of their training and experience, and that certifications from this register are not requested unless appointments therefrom are deemed absolutely necessary in order to make the most advantageous use of positions, which in many instances are very limited in number and the incumbents of which must therefore be assigned to various kinds of clerical duties from time to time in order to meet the needs of the bureau in which they are employed.

THE DISTRICT SYSTEM.

Several years ago the Civil Service Commission, with the approval of the several departments, established what is known as the district system of certification for filling clerical and certain other positions in the field service outside of Washington, D. C. Under this system eligible registers are established and maintained in the offices of the secretaries of the twelve civil-service districts in the United States and of the local representatives of the Commission at San Juan, P. R., Honolulu, Hawaii, and Juneau, Alaska; and certification of eligibles is issued by such representatives of the Commission direct to the field officers of the Department for selection. Owing to the centralized administration of personnel matters in this Department, and because it was thought that the proposed plan would prove inadequate or inconvenient and its obvious tendency would be toward decentralization of the field service, the Department very reluctantly gave its assent to the change from the former practice under which certification was made direct to the Department from the office of the Commission at Washington. The Department was willing to give the plan a thorough trial for the purpose of determining its advantages or disadvantages, and with that end in view promulgated regulations for the guidance of those concerned. These regulations, which were first issued on April 1, 1911 (Department Circular No. 224), were amended and reissued, with the approval of the Civil Service Commission, on October 24, 1912 (Department Circular No. 243), and in the revised form are believed to be giving much more satisfaction. They have materially lessened the delay which was previously unavoidable. The following important changes may be mentioned particularly:

General authority, with certain exceptions, is given to field officers to proceed toward filling vacancies, whereas under the old regulations antecedent authority through official channels was required in each instance.

Nominations for appointment are submitted by the field officers direct to the bureau instead of through the district secretary, as previously required.

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A new regulation setting forth full and explicit instructions as to the conditions under which appointees, both permanent and temporary, may be assigned to duty, has been added.

The regulation relative to temporary appointments and the manner and conditions under which they may be made has been carefully revised.

Since the Immigration Service, which particularly appeared to experience the most trouble with this method of certification, has been transferred to the Department of Labor, and as the amended regulations have removed some of the more serious objections to the system, this Division now sees no reason, so far as the field services are concerned, why the system should not continue in force, at least unless circumstances so change as to require a return to the former practice.

The district system as applied to certain positions in the Lighthouse Service is referred to in another part of this report.

CONNECTED CIVIL-SERVICE CERTIFICATES.

Paragraph (*a*), section 1, civil-service Rule VII, provides, in part, that—

> The nominating or appointing officer shall request the certification of eligibles, and the Commission shall certify * * * a number of names sufficient to permit the nominating or appointing officer to consider three names in connection with each vacancy.

Instances occur when similar positions in two or more bureaus become vacant at approximately the same time, and with a view to filling them (upon the bureaus' recommendations) separate requisitions are made almost simultaneously upon the Civil Service Commission for certifications of eligibles having the same qualifications. A full certification of three names is issued in response to the first requisition, provided, of course, there is a sufficient number on the particular register used, but on the second certificate may appear only one name and the statement "together with those not appointed whose names appear on certificate No. ——" (the first certificate). The bureau receiving the second certificate is deprived of a full certification until the bureau which has the first certificate submits its report. As the eligibles reside in all parts of the United States and are communicated with in order to ascertain whether they will accept appointment if tendered, it is obvious that some time must elapse before a bureau can make its report to the Department. Then, too, only one of the eligibles on the first certificate may indicate his willingness to accept while the remaining two may decline appointment, thus necessitating, for consideration by the bureau having the second certificate containing the one name, another request upon the Civil Service Commission for additional names. As, in the regular course, approximately three weeks elapse from the date of a bureau's request for eligibles until a report upon the certificate is submitted, the work of the second bureau, while it awaits the first bureau's report, may fall considerably behind. The following example is given as a typical one:

On October 12, 1912, and October 15, 1912, respectively, two bureaus made requests for similarly qualified eligibles, in response to which the Civil Service Commission issued connected certificates.

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The first certificate contained the names of three eligibles and the second certificate contained the name of one eligible, which was to be considered in connection with the two eligibles not selected from the first certificate. On November 4, 1912, the Department reported to the Commission the selection of one eligible and the declinations of the two remaining eligibles from the first certificate and made a supplemental request for two additional names to be considered in connection with the one name appearing on the second certificate. As the additional names were transmitted to the second bureau on November 18, 1912, it will be seen that a little more than a month had elapsed from the date of its request until it received the full certification to which it was entitled.

As, with but one exception, the bureaus of the Department have been located at some distance from the Secretary's Office, the greater portion of a day has been required in both the transmission of certificates and papers from and the return of certificates and papers by the bureaus. This item, though apparently a small one, necessarily delays transaction of business.

Temporary appointments pending the permanent filling of vacancies by selection from the eligible register are sometimes made, with the authority of the Civil Service Commission. Such appointments are not favored by the civil-service rules or by the Department and certainly are not in the best interests of the service, as time and energy must necessarily be wasted in training employees whose services continue only for brief periods. It is recommended by those having the matter in direct charge that the Department urgently press upon the Civil Service Commission the desirability of having a full certificate issued for each vacancy.

LIGHTHOUSE SERVICE.

The placing of the Lighthouse Service upon a civilian basis has been practically completed. During the fiscal year ended June 30, 1913, civilian inspectors replaced the Navy officers in charge of the Ninth, Eleventh, Twelfth, and Nineteenth districts, the only districts which remained in charge of such officers. The Thirteenth, Fourteenth, and Fifteenth districts, which include the Mississippi River and its tributaries, are still under the supervision of Army engineers, the act of June 17, 1910, providing for a Bureau of Lighthouses and for other purposes, having authorized the President to assign Army engineers to act in lieu of civilian inspectors in those districts for an indefinite period.

On January 28, 1913, the Department adopted new regulations for the Lighthouse Service, the effect of which was to place all civil-service matters pertaining to noneducational competitive classified positions in this Service under the direct supervision of the district secretaries of the Civil Service Commission. The regulations provide that there shall be a local board of examiners in each lighthouse district, composed of the superintendent or assistant superintendent, the chief clerk of the district, and the district secretary or some other representative of the Civil Service Commission, the latter to act as chairman and the chief clerk as secretary of the board; also that registers of eligibles for all noneducational positions which are

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peculiar to the Lighthouse Service (except those for which registers are maintained by the district secretary for other branches of the public service) are to be established by the local boards. Duplicate copies of such registers are furnished the district secretary, who retains one copy in his office and transmits the other to the Civil Service Commission. Previous to the adoption of the regulations it had been the practice to forward two copies of these registers to the Department, which retained one copy and transmitted the other to the Commission. The registers maintained at the Department were used to check nominations submitted for probationary appointments, in order to determine whether the selections were regular. At present, however, such nominations are forwarded through the district secretary, who, if selection is regular, notes his approval and transmits them to the Bureau. The registers maintained by the Department, being of no further value, have been abandoned. Recommendations for temporary appointment and extensions thereof are also sent to the district secretary for approval. The Department has authority, however, to make a temporary appointment for a period not to exceed one month without obtaining the prior approval of the district secretary, when the exigencies of the service require such action.

The regulations also provide that examination and registration need not be required in cases of mechanics and skilled tradesmen or laborers when employed upon construction or repair work in the field and at a distance from the headquarters of the local board, for special job work, or for the working season only (not to exceed six months), but that all other positions in this force must be filled from registers established by the local boards. Nominations for employment in the field construction force, however, are not submitted to the district secretary for approval, but each inspector is required to make a monthly report of all changes in this force and to forward it to the Department through the district secretary, who audits it to see that the selections and other changes are regular. Previous to the adoption of the regulations the prior approval of the Civil Service Commission was obtained before transferring an employee from one position to another when the entrance tests for the positions were different, but this will no longer be necessary, as the regulations provide that any noneducational employee may be promoted or transferred to another noneducational position if, in the opinion of the lighthouse inspector, he is qualified for such promotion or transfer. When the promotion or transfer is reported in the monthly report of changes in the personnel, the Civil Service Commission will determine whether or not an examination should be required.

A change has also been made in the manner of determining whether a claim for preference under section 1754 of the Revised Statutes is well founded, such matters now being taken up with the Commission through the district secretary instead of through the Department.

The regulations are very complete, covering practically every phase of the administration of civil-service matters in the Lighthouse Service, but it is too soon to make any positive statement as to whether or not they have worked an improvement in the Service. They should work satisfactorily enough in districts in which the offices of the lighthouse inspectors and district secretaries are in the

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same cities, but some delay will probably be occasioned in districts in which offices are in different and widely separated localities.

During the past year and a half several requests have been made upon the Department to grant leave of absence with pay to mechanics and laborers at the General Lighthouse Depot, at Tompkinsville, N. Y., who are paid upon a per diem basis. The Department was unable to give these requests favorable consideration in view of the fact that the Comptroller of the Treasury had decided that employees compensated at a per diem rate of pay could not be paid for days on which they performed no service, except holidays and other days for which payment had been specifically authorized by Congress. There are some prospects, however, that this situation may be changed, as two bills were introduced in Congress, on December 10, 1912, and April 17, 1913, respectively, providing that each and every employee of the Lighthouse Service compensated at a per diem rate of pay be granted 15 working days' leave of absence each year without forfeiture of pay. At the present time per diem employees of navy yards, gun factories, naval stations, and arsenals of the United States are granted 15 days' leave of absence each year without forfeiture of pay, and it would seem to be equitable to extend the same privilege to per diem employees of the Lighthouse Service.

On March 1, 1913, the Department approved the Bureau's recommendation that members of crews of light vessels and tenders be allowed 60 days' pay while ill in hospitals, this action being taken after the matter had been carefully considered by its committee on economy and efficiency. The Department first took the view that it would not be desirable to grant this privilege until members of crews served under enlistments, as do persons similarly employed in the Coast and Geodetic Survey, but finally decided to grant it with the understanding that no employee could avail himself of the privilege until he had served at least one year prior to his entrance to the hospital and two months after his return therefrom.

Considerable difficulty has been experienced in obtaining properly qualified eligibles for the positions of cadet officer and cadet engineer at the usual entrance salary of $600 and $660 per annum, respectively. In the early part of February of this year there were 6 vacancies in a total of 16 positions of cadet officer, and 4 in a total of 14 positions of cadet engineer, for which the Civil Service Commission was unable to certify properly qualified eligibles, notwithstanding the fact that several examinations had been held for each position. In view of this condition the Commissioner of Lighthouses, under date of February 17, 1913, recommended that the number of the positions mentioned be reduced to five each, which recommendation was approved by the Department with the understanding that the employees occupying the positions to be abolished would be promoted to those of second officer and second assistant engineer, respectively, should they possess the necessary qualifications.

OPINIONS OF THE ATTORNEY GENERAL.

During the year the Attorney General rendered but two opinions bearing on the personnel of the Department, as follows:

(1) June 2, 1913, that section 4 of the legislative, executive, and judicial appropriation act approved August 23, 1912, protects honorably discharged soldiers or sailors, whose departmental record is good, from being discharged

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or dropped, or reduced in rank or salary, "in the event of reduction being made in the force in any of the executive departments," but that it does not prohibit the head of a department from conforming the salary of an honorably discharged soldier or sailor to the grade or character of work he may be called upon to perform.

(2) June 23, 1913, that the term "classified civil service," in section 6 of the Post Office appropriation act approved August 24, 1912, should not be held to include excepted positions, unless such positions have been filled as competitive positions are filled, in which event, under Rule II, paragraph 3, of the civil-service rules, the person appointed is entitled to all the rights of a competitive employee.

DECISIONS OF THE COMPTROLLER OF THE TREASURY.

The Comptroller of the Treasury rendered a number of important decisions on matters pertaining to the personnel during the year. Nearly all of the decisions related to the interpretation and application of section 3 of the act of August 23, 1912, and section 7 of the act of August 26, 1912, which are quoted in another part of this report. The decisions have been carefully studied and digested in this Division for the information and guidance of interested parties, and the discussion with bureau officers of the questions decided undoubtedly resulted in the facilitation of appointment work.

A brief outline of the decisions rendered is given below:

(1) September 20, 1912, that the appropriation "To further promote and develop the foreign and domestic commerce of the United States * * *" is available for the payment of employees of the Bureau of Foreign and Domestic Commerce to travel within the United States or abroad, but that it is not available for the payment of clerical services at the seat of government, the latter being prohibited by the act of August 5, 1882.

(2) September 20, 1912, that section 3 of the act of August 23, 1912, prohibits the transfer of any person from a position having a specific salary provided by statute to any position with greater compensation which has been created under a lump-sum appropriation. (See decision of June 6, 1913, post.)

(3) September 26, 1912, that the provision in section 3 of the act of August 23, 1912, that no person employed at a specific salary under that act shall be transferred during the fiscal year 1913, and be paid from lump-sum appropriations a rate of compensation greater than such specific salary, applies only to persons whose salary is fixed by statute; and

That the provision in said section that no part of any money appropriated in lump sum in that act shall be available for personal services at a rate of compensation in excess of that paid for the same or similar services during the fiscal year 1912 does not prohibit increases by way of promotion, so long as the rate paid during the year 1912 for similar services rendered in the same or like places under the same or like conditions is not exceeded.

(4) October 19, 1912, that the discretion of the Secretary in fixing compensation of clerks in the offices of steamboat inspectors and shipping commissioners is limited by section 3 of the act of August 23, 1912, to the rate paid for the same or similar services during the fiscal year 1912; and

That a reduction in the salary of a clerkship in the office of a steamboat inspector at New York will not warrant a corresponding increase in the salaries of other like clerkships at New York or elsewhere over the rate paid to the same or like clerkships during the fiscal year 1912.

(5) November 13, 1912, that the rate of compensation paid during 1912 is a question of fact to be determined in each case, and is not necessarily either the maximum or the average rate for that year, but the rate paid for service of the same character rendered with the same degree of proficiency and under the same general conditions; also that questions of proficiency are properly determined by the administrative officers.

(6) December 11, 1912, that the last clauses of section 3 of the act of August 23, 1912, and section 7 of the act of August 26, 1912, relate to compensation only and do not prohibit the payment of actual expenses when otherwise lawful, but do prohibit commutation of such expenses at a fixed per diem and the payment

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of such per diem in addition to a compensation equal to the specific salary received prior to transfer to a lump-sum roll.

(7) December 14, 1912, that the salary of the Director of the Census, the Chief Clerk, and the Geographer of the Bureau of the Census should be paid from July 1, 1912, at the rate provided for in the legislative, executive, and judicial appropriation act approved August 23, 1912, and not at the rate authorized during the Thirteenth Decennial Census period.

(8) February 17, 1913, that where an employee is transferred from a statutory position to a position on a lump-sum roll carrying with it a right to a per diem in lieu of subsistence specifically appropriated by Congress, such per diem is not a part of the compensation and such employee is entitled to the per diem in addition to a compensation not exceeding his former statutory salary.

(9) February 17, 1913, that an interpreter can not be employed in the Children's Bureau and be paid from the appropriation for contingent expenses of the Department.

(10) April 1, 1913, that a special agent of the Bureau of the Census can be detailed by the Secretary of Commerce to perform duties imposed upon him (the special agent) by the President in appointing him as a member of a commission to investigate credit unions, etc., in European countries, and as a delegate to the International Institute of Agriculture, provided the services of such special agent can be spared from his duties in the Bureau of the Census and that there is no law requiring him to be engaged exclusively upon the work of that Bureau.

(11) June 6, 1913, that the last clauses of section 3 of the act of August 23, 1912, and section 7 of the act of August 26, 1912, do not prohibit a bona fide transfer from a specific salary provided by statute to a position at a higher rate on a lump-sum roll, provided the duties of the latter position are not in fact the same or similar to those of the former, and that the rate of compensation of the latter position is not in excess of that paid for the same or similar services during the preceding fiscal year.

(12) June 24, 1913, that section 7 of the act of March 4, 1913, which provides that no part of any money contained therein or thereafter appropriated in lump sum shall be available for the payment of personal services at a rate of compensation in excess of that paid for the same or similar services during the preceding fiscal year, places a restriction on the discretion of the Secretary of Commerce to regulate the salaries of lighthouse keepers in accordance with the provisions of section 4673 of the Revised Statutes, and

That the words "same or similar services" are not to be interpreted as applying to a particular light station, light vessel, or tender, but to other light stations, light vessels, or tenders as well, when the duties performed and the conditions met are practically the same.

COMPILATION OF STATISTICS.

The Division is frequently called upon to compile statistics relating to the personnel. From the following statements, which by no means represent the total amount of statistical work for the year, some idea may be formed of the various kinds of data compiled:

(1) Number of superannuated employees in the various bureaus, their salaries, degree of superannuation, and estimated salary loss by bureaus.

(2) Names, ages, color, dates of death, bureaus in which employed, designations, and salaries of employees in the District of Columbia who died during the year 1912.

(3) Names, bureaus in which employed, salaries, and military or naval service of employees who are pensioned and the amount of their pensions (the latter having been obtained from the Bureau of Pensions).

(4) Names, positions, salaries, places of employment, and civil-service status of the more important officers in the various branches of the Department in the State of Washington.

(5) Number and location of employees in the Department of Commerce and Labor July 1, 1903.

(6) Officers and employees of the Department of Commerce in Washington, D. C., by bureaus, designations, and salaries.

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(7) Names, positions, salaries, places of employment, and civil-service status of employees of the Department (on March 3, 1913) who claimed legal residence in the State of Massachusetts and were employed outside of that State.

(8) Presidential and certain other positions of the Department, by bureaus and salaries.

(9) Names, bureaus, places of employment, positions, salaries and dates of appointment of persons from Philadelphia, Pa., appointed to unclassified positions and to positions in the classified service which are excepted from competitive examination.

(10) Designations, number, and salaries of the various kinds of "agents" employed in the Department.

(11) Average amount of annual and sick leave, both separately and together, taken by employees of the Department in the District of Columbia during the calendar year 1912. (See p. 599 of this report.)

(12) Names of persons in the Department in Washington, D. C., on September 1, 1912, who were appointed from the State of Michigan.

(13) Names, positions, salaries, places of employment, and tenure of persons appointed from Pennsylvania to classified excepted and unclassified positions.

(14) Names, designations, salaries, places of employment, and branches of service in which employed, of persons holding positions in Louisiana "that are not under civil service."

(15) Names, legal residences, salaries, places of employment, and dates of commissions of presidential officers in the Immigration Service.

(16) Designations, number, and salaries of positions in the Division of Alaska Fisheries, Bureau of Fisheries, and manner of appointment thereto.

(17) Description of classified competitive, classified excepted, and unclassified services, and designations, salaries, and classification of certain of the more important positions in the various bureaus.

(18) Number and salaries of assistants (scientific and laboratory) and number and salaries of clerks employed in the District of Columbia.

(19) Decriptions of law bureaus of Department, number of clerks employed therein, their grades and salaries, approximate amount of space each of such bureaus occupies, and approximate number and value of volumes contained in each law library.

(20) Employees in Washington, D. C., claiming legal residence in the first, second, third, fourth, fifth, and sixth congressional districts of Pennsylvania.

(21) Names, designations, compensation, dates of original appointment, town or city from which appointed, and civil-service status of persons in the service of the Department employed in the District of Columbia on September 1, 1912.

(22) Names and designations of officers and employees of the different bureaus stationed at Philadelphia, Pa.

(23) Names and legal residences of presidential officers (other than the Secretary and Assistant Secretary), titles and compensation of positions held by them, and dates of their appointments.

(24) Designations, dates of appointment of incumbents, legal tenure, and salaries of positions to which appointment is made by the President, by and with the advice and consent of the Senate, together with the names, salaries, etc., of positions in the classified service next in rank to appointees of the President in the same organization.

(25) Designations and salaries of positions which may be filled without examination under the civil-service rules, by appointment by the President and by the head of the Department.

EXECUTIVE ORDERS.

During the year the following Executive orders affecting the personnel were promulgated:

SPECIAL EXCEPTIONS TO THE CIVIL-SERVICE RULES.

(1) July 12, 1912: Issued upon the recommendation of the chairman of the Tariff Board in order to permit the retention in the service, after the board had been abolished, of those persons who had rendered meritorious service, permitting, with the approval of the Civil Service Commission, the transfer or appointment of 14 Tariff Board employees to appropriate positions in the competitive classified service. One of these persons was transferred to the position of clerk in the Children's Bureau.

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(2) August 21, 1912: Authorizing the employment until June 30, 1913, without reference to the civil-service rules, of machinists, toolmakers, electricians, and apprentice boys (machinists) in the machine shop of the Bureau of the Census, in connection with the continuation of the Thirteenth Decennial Census work.

(3) October 18, 1912: Authorizing the appointment in the Bureau of Navigation of a clerk (deputy shipping commissioner). The person recommended in this exception had given satisfaction in the position while serving under a temporary appointment.

(4) October 28, 1912: Authorizing the appointment of a chief inspector in the Radio Division, Bureau of Navigation. The person appointed had served for eight years in the Signal Service of the War Department in radiotelegraphic work and possessed the qualifications needed for the position.

(5) October 28, 1912: Authorizing the appointment as special agent in the Bureau of Corporations of a former special agent in the Bureau of the Census, who was specially qualified for the position.

(6) October 29, 1912: Permitting the appointment of a special agent in the Bureau of Corporations. The person appointed had specialized in economics, and had spent several years doing expert work for the International Waterways Commission. It was shown that he was specially fitted for special agent duties.

(7) December 7, 1912: Authorizing the appointment as immigrant inspector in the Immigration Service of a former clerk in the Bureau of the Census.

(8) December 17, 1912: Authorizing the appointment to a competitive classified position of a special agent in the Bureau of the Census. The person named in the order had held various responsible positions in the Government service, and had been assigned to important work in the Bureau of the Census. (No appointment was made by this Department under this exception.)

(9) January 1, 1913: Authorizing the reinstatement of an immigrant inspector, who had served for more than ten years in that position prior to his resignation. (The person recommended in this exception did not receive appointment in this Department, but was appointed in the Department of Labor.)

(10) January 27, 1913: Permitting the appointment of a clerk (librarian-translator) in the Children's Bureau. The person appointed had passed the required examination and stood second in point of rating, but being a resident of the District of Columbia, under the law of apportionment, was ineligible for certification. She had demonstrated her fitness for the position while serving under temporary appointment.

(11) June 27, 1913: Waiving the provision of section 6 of civil-service Rule XI, which prohibits the transfer or promotion of messenger boys to positions in the apportioned service, so as to permit the promotion of a messenger boy who had a very high record for efficiency during his service of more than three years, to the position of assistant messenger in the Office of the Secretary.

MISCELLANEOUS ORDERS.

(1) August 1, 1912: Declaring the first Monday in September, commonly known as Labor Day, to be a holiday for all purposes for per diem employees and other day laborers in the Federal public service.

(2) August 23, 1912: Designating the Director of the Census to perform the duties of the Chief of the Bureau of Foreign and Domestic Commerce, pending the appointment of that officer.

(3) August 24, 1912: Excepting the temporary office of moderator of a town meeting and offices of like character from the provisions of Executive order of January 17, 1873, which prohibit Federal civil-service employees from holding municipal offices. This order permits the holding by Federal officers of temporary municipal officers of the character mentioned where no salary or other emolument is received and where such service does not interfere with the regular and efficient discharge of the duties of the Federal office, provided that the employee refrains from taking part in national, State, or county politics in violation of the civil-service rules.

(4) August 26, 1912: Amending Subdivision I, Schedule A of the civil-service rules by the addition of a section containing the substance of Executive order of December 1, 1910, excepting from competitive examination certain positions of unusual character as to duties or compensation and for which qualified persons are so rare that in the judgment of the Commission they can

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not in the interests of good civil-service administration be filled through competitive examination.

(5) February 12, 1913: Directing that members of the Grand Army of the Republic, the United Spanish War Veterans, the Army and Navy Union, and the Woman's Relief Corps, in the Government service, who desired to attend the battleship Maine services at Arlington National Cemetery on February 15, 1913, be excused from duty.

(6) February 28, 1913: Providing that all per diem employees and other day laborers in the Federal public service, employed in the District of Columbia, be excused from work on Inauguration Day, March 4, 1913.

(7) May 27, 1913: Authorizing the Solicitor of the Department of Commerce to perform the duties of Secretary of Commerce during the absence of that officer and the Assistant Secretary of Commerce.

(8) June 6, 1913: Amending Schedule A, Subdivision I, paragraph 2, of the civil-service rules so as to permit the appointment without examination of one private secretary or confidential clerk to each of the heads of bureaus appointed by the President in the executive departments, if authorized by law. Before this amendment the exception was restricted to the heads of bureaus appointed by the President and confirmed by the Senate.

SERVICE RECORDS.

The service-record system in the Appointment Division consists of a complete card record of all positions subject to appointment by the head of the Department. The cards are arranged by bureaus and services, and subdivided by guide cards into divisions, grades, and classes, the field services being arranged by districts, offices, stations, substations, vessels, etc. Positions are represented either by service-record cards for employees or by vacancy cards showing information as to the positions, the names of the last incumbents, dates and causes of separation, or in the case of original vacancies information as to authorization.

Supplemental to the information shown on the service-record cards relative to the personal history of employees, tabs which appear above the upper edges of the cards indicate a variety of information relative to the employees, such as sex, whether native or foreign born, military or naval service if any, and status of employees and positions with respect to civil-service act and rules and Executive orders. In addition colored steel signals attached to the upper edge of the card have been adopted during the year and used to indicate information necessary in special cases, as in the preparation of statistical tables, as cautions to exceptions to general rules and authorizations, etc. Guide and supporting cards to the service-record system also supply additional information as to forces at various offices and stations, complement of vessels, cases to be called up for consideration in connection with possible changes, etc. For ready reference an alphabetical index of employees is maintained. Changes in status of employees and of positions are posted daily and the records are being constantly revised and extended to classify and record briefly and without unnecessary duplication any information that may be of value. With the information as to the personnel and positions thus compiled and kept revised to date, the Department is provided with the means to consider intelligently all manner of recommendations necessary in current administration and to compile promptly statistical tables and data, not only for its own use, but also for information often required by the President, committees in Congress, and others. The system of keeping these records as now established and

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maintained is believed to be superior to any in use elsewhere in the Government service, except, possibly, in the departments and offices in which the card originally introduced by this Department has been adopted.

DESTRUCTION OF USELESS PAPERS.

It has been the practice to review the files annually for the purpose of recommending the destruction or other disposition, as provided for by act of February 16, 1889, of all papers and documents not needed in the transaction of the current business of the Department and which have no permanent value or historical interest.

In view of the fact that the Department contemplated moving into new quarters, and in order to eliminate the expense of moving useless papers, the examination of the files this year was especially thorough. The additional filing space afforded by the removal of such papers from the files has made the purchase of additional filing furniture unnecessary during the present fiscal year.

Respectfully submitted.

GEO. W. LEADLEY,
Chief of Appointment Division.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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REPORT

OF THE

CHIEF, DIVISION OF PUBLICATIONS

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REPORT

OF THE

CHIEF, DIVISION OF PUBLICATIONS.

DEPARTMENT OF COMMERCE,
DIVISION OF PUBLICATIONS,
Washington, September 29, 1913.

SIR: The following report concerning the work of the Division of Publications during the fiscal year ended June 30, 1913, is respectfully submitted.

On April 1, 1913, the Chief of the Division of Publications was promoted to the office of Chief Clerk of the Department, and the present incumbent of the office of Chief of the Division of Publications was promoted to that position from clerk in the Division.

ALLOTMENT AND EXPENDITURES.

The act of August 24, 1912, making appropriations for the sundry civil expenses of the Government for the fiscal year ending June 30, 1913, and for other purposes, allotted to the Department $400,000 for printing and binding during the fiscal year 1913. This sum was an increase of $25,000 over the allotment for the previous year, the increase being granted by Congress so that the printing and binding for the Bureau of the Census (except that in connection with inquiries of the Thirteenth Decennial Census), which had since 1909 been paid for from lump appropriations for the Thirteenth Census, could be paid for from the allotment to the Department. Of the $400,000 thus made available, $399,996.86 was expended, leaving an unexpended balance of $3.14.

Of the total allotment to the Department $76,750 was suballotted to the several bureaus, offices, and services transferred to the Department of Labor by the act of March 4, 1913, creating that Department. Of the $76,750 so suballotted there was expended for those bureaus, offices, and services up to May 5, 1913, $41,702.60, leaving a balance of $35,047.40, which amount was transferred to the Department of Labor on May 9, 1913.

All work ordered by the Department of Commerce and Labor and the Department of Commerce prior to May 5, 1913, for the bureaus, offices, and services transferred to the Department of Labor, and remaining on that date at the Government Printing Office uncompleted and unbilled, as well as all work ordered during the balance of the fiscal year by the Department of Labor, was charged against the balance of $35,047.40. A record of these expenditures was kept

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by the Department of Labor, and not by this Department; consequently detailed figures relating to them do not appear in this report. For the bureaus, offices, and services now in the Department of Commerce there was expended from the Department's general allotment $323,246.86.

In addition to the $399,996.86 expended from the general allotment for 1913, the Department furnished printing and binding to the Bureau of Navigation for the Radio Service costing $1,716.58, for which it was reimbursed from the appropriation "Enforcement of wireless communication laws, 1913;" also it furnished work to the Bureau of the Census costing $5,011.48, of which $383.29 was reimbursed from the appropriation "Tobacco statistics, Bureau of the Census, 1913," and $4,628.19 was reimbursed from the appropriation "Cotton statistics, Bureau of the Census, 1913." These additional expenditures aggregated $6,728.06 and made a grand total of $406,724.92 expended by the Department during the year, as compared with a total of $374,995.64 in 1912.

The increase in expenditures in 1913 over 1912 was $31,729.28. The total expenditures in 1913, however, include $38,270.24 for the Bureau of the Census, while the figures for 1912 are exclusive of expenditures for that Bureau, printing and binding for which in 1912 was paid for from appropriations for the Thirteenth Decennial Census. Deducting expenditures for the Bureau of the Census in 1913 and comparing the remainder ($368,454.68) with expenditures for all the other bureaus, offices, and services of the Department in 1912 ($374,995.64) shows that there was a decrease of $6,540.96 in such expenditures. Carrying the comparison still further and omitting also expenditures in both years for the bureaus, offices, and services transferred to the Department of Labor there was a decrease of $8,963.07. The suballotments in 1913 to the several branches of the Department of Labor totaled $2,422.11 more than their expenditures in 1912.

The estimated cost of unbilled and uncompleted work of the Department at the Government Printing Office on July 1, 1912, was $28,035.87, of which sum $2,657.92 was for bureaus, offices, and services since transferred to the Department of Labor, leaving $25,377.95 chargeable to branches of the service, other than the Bureau of the Census, now constituting the Department of Commerce. The Department later assumed liabilities of the Bureau of the Census amounting to $15,590.74 for such work, making a total of $40,968.69 which had to be paid out of the 1913 allotment for work ordered but not completed during the prior fiscal year. This is partly offset by the work at the Printing Office on July 1, 1913, the cost of which was estimated at $32,660.20. Of this sum $5,252.91 was for the Bureau of the Census and $27,407.29 for the other bureaus, offices, and services of the Department. Excluding the Bureau of the Census and bureaus now constituting the Department of Labor, which is necessary to arrive at any satisfactory comparison, the estimated cost of unbilled and uncompleted work at the Government Printing Office on July 1, 1913, was $2,029.34 in excess of the estimated cost of such work at that office on July 1 of the preceding year.

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COST OF PRINTING AND BINDING, BY BUREAUS.

During the fiscal year 1913 the Department issued on the Public Printer 3,634 requisitions for printing and binding, as compared with 3,466 during the preceding fiscal year, an increase of 168. The number for 1913 includes requisitions covering work ordered only up to and including May 5, 1913, for the bureaus, offices, and services transferred to the Department of Labor.

The following table shows the cost of printing and binding for each of the bureaus, offices, and services of the Department during the fiscal years 1912 and 1913, together with the increase or decrease for each bureau, office, and service and the estimated cost of the work on hand but not completed June 30, 1913:

Bureau, office, or service.	Cost of work delivered.		Increase (+) or decrease (−).		Estimated cost of work not completed June 30, 1913.
	1912	1913	Cost.	Per cent.	
Office of the Secretary	$12,900.75	$19,408.28	+$6,507.53	+ 50.44	$1,571.71
Appointment Division	401.13	396.05	− 5.08	− 1.27	36.18
Disbursing Office	756.06	1,133.42	+ 377.36	+ 49.91	164.19
Division of Supplies	281.01	383.75	+ 102.74	+ 39.36	3.50
Bureau of Corporations	9,299.40	11,524.50	+ 2,225.10	+ 23.93	56.95
Bureau of Foreign and Domestic Commerce	[a]145,778.58	142,818.07	− 2,960.51	− 2.03	8,586.07
Coast and Geodetic Survey	31,267.82	26,526.52	− 4,741.30	− 15.16	4,757.98
Bureau of Fisheries	9,740.45	12,897.91	+ 3,157.46	+ 32.42	1,896.86
Bureau of Navigation	12,321.44	[b]12,130.37	− 191.07	− 1.55	98.00
Shipping Service	2,669.20	2,032.81	− 636.39	− 23.84	322.59
Radio Service	88.57	1,102.21	+ 1,013.64	+1,144.45	123.59
Office, Supervising Inspector General, Steamboat-Inspection Service	4,278.54	2,456.71	− 1,821.83	− 42.58	6.31
Steamboat-Inspection Service	10,630.73	6,767.34	− 3,863.39	− 36.34	1,316.95
Bureau of Lighthouses	18,168.35	20,219.62	+ 2,051.27	+ 11.29	1,407.37
Lighthouse Service	9,223.16	6,716.44	− 2,506.72	− 27.18	876.94
Bureau of Standards	20,475.67	18,278.49	− 2,197.18	− 10.73	3,187.20
Customs Service	12,406.89	6,932.19	− 5,474.70	− 44.13	2,996.90
Bureau of the Census	[c]	[d]38,270.24			5,252.91
Bureaus, offices, and services transferred to Department of Labor	74,327.89	[e]76,750.00			
Total	374,985.64	[f]406,724.92	+31,729.28	+ 8.46	32,660.20

[a] This amount was expended jointly during 1912 by the Bureau of Manufactures and the Bureau of Statistics, which were consolidated into the Bureau of Foreign and Domestic Commerce on Aug. 23, 1912.

[b] Of this amount $1,716.58 covers printing done for the Radio Service, and the Department's allotment for printing and binding was reimbursed to that extent.

[c] Printing and binding for the Bureau of the Census was paid for in 1912 from appropriations for the Thirteenth Decennial Census.

[d] Of this amount $5,011.48 covers printing done in connection with publishing statistics of cotton and tobacco, and the Department's allotment for printing and binding was reimbursed to that extent.

[e] Of this amount $41,702.60 was expended by the Department up to May 5, 1913, and the balance ($35,047.40) was transferred to the Department of Labor on May 9, 1913.

[f] Of this amount $6,728.06 covers printing done for the Bureau of Navigation and the Bureau of the Census for which the Department's allotment was reimbursed.

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QUANTITY AND COST OF PRINTING AND BINDING, BY CLASSES.

The following statement shows the amount and cost of each class of work called for by requisitions on the Public Printer during the fiscal year 1913, and affords a comparison with the amount and cost of these classes during the preceding two fiscal years:

Class.	1911		1912		1913 [a]	
	Number.	*Cost.*	*Number.*	*Cost.*	*Number.*	*Cost.*
Blank forms	12,378,007	$51,369.94	12,269,911	$51,112.95	13,102,505	$44,791.41
Reports, pamphlets, etc	5,276,080	269,387.99	6,935,745	288,017.67	7,452,145	295,746.69
Letterheads	2,254,000	4,209.92	2,110,000	3,830.71	2,101,500	3,247.41
Envelopes	[b] 98,250	175.10	46,225	156.19	48,045	173.70
Circulars, decisions, and notices	370,525	2,986.76	308,450	1,882.06	158,650	820.00
Index cards	1,644,500	1,397.56	689,200	692.25	854,900	782.26
Guide cards and folders	623,310	2,352.07	595,150	1,826.50	205,900	1,126.57
Memorandum sheets	3,596,700	2,665.06	1,156,400	1,252.48	4,699,600	2,340.84
Blank books	28,069	30,103.46	19,113	23,064.25	30,818	16,081.81
Miscellaneous books (binding)	2,858	5,448.64	1,355	2,532.35	3,206	5,003.34
Miscellaneous	.....	71.25	.....	628.23	.....	1,563.49
Transferred to Department of Labor on May 9, 1913	.....	.....	.....	.....	.....	35,047.40
Total	.....	370,167.75	.....	374,995.64	.....	[c]406,724.92

[a] Figures in these columns are for the several classes of work for the Department of Commerce and Labor from July 1, 1912, to Mar. 4, 1913; for the Department of Commerce from Mar. 5, 1913, to June 30, 1913, and for the Department of Labor from Mar. 5, 1913, to May 5, 1913.

[b] Of these, 40,000 were synopsis envelopes for the Customs Service, which in 1912 and 1913 are included in blank forms.

[c] Of this sum $6,728.06 covers printing and binding done for the Bureau of Navigation and the Bureau of the Census for which the Department's allotment was reimbursed.

ENVELOPES AND SPECIAL WATERMARKED PAPERS.

During the year orders to the number of 616 (against 627 in 1912) were placed with the envelope contractors for 4,269,650 envelopes (a decrease of 1,103,850, or 20.54 per cent), at a cost of $6,822.43, for the use of the various offices, bureaus, and services of the Department, including the Bureau of the Census.

Also there were placed with the contractors orders for making 164,724 sheets of special watermarked papers on which to print declarations of intention and petitions for naturalization, costing $2,559.12 (compared with 83,712 sheets, costing $1,384.06, in 1912), and 25,683 sheets of distinctive safety paper on which to print certificates of naturalization, costing $489.52 (against 124,507 sheets, costing $2,373.10, in 1912).

BLANK BOOKS AND FORMS.

There were received and filled during the past year 8,823 requisitions from the outside services of the Department, calling for 8,330,606 blank forms, compared with 8,093,849 in 1912 (an increase of 236,757, or 2.93 per cent), and 298,044 books and pamphlets, compared with 315,203 in 1912 (a decrease of 17,159, or 5.44 per cent).

To fill these 8,823 requisitions required the making of 13,065 packages and the packing of 897 boxes or trunks and 572 bags, of a total weight of 271,684 pounds, or nearly 136 tons, of which 224,562 pounds were sent by regular mail, 29,608 pounds by registered mail, and 17,514 pounds by freight. The letters and invoices written and

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sent in connection with forwarding these books and blanks numbered 11,500.

The following table shows the number of books and blanks sent to each of the outside services during the fiscal years 1912 and 1913, with the increase or decrease in each class for each of the services. Although the supplies for the Immigration and Naturalization Services were nominally taken over by the Department of Labor in May, separation of the records was not completed until July 1, and much of the work in connection with filling requisitions for these services continued to be performed by employees of this Division. For this reason and also to permit comparison with the work of the preceding year, all figures for 1913 have been compiled to cover the year ended June 30.

Service.	Books.			Blanks.		
	1912	1913	Increase (+) or decrease (−)	1912	1913	Increase (+) or decrease (−)
Customs Service:						
General	9,759	8,423	− 1,336	449,953	437,598	− 12,355
New York	307	494	+ 187	96,150	40,400	− 55,750
Immigration Service:						
General	1,783	4,137	+ 2,354	2,629,575	2,624,842	− 4,733
New York	128	80	− 48	617,500	1,026,500	+409,000
Shipping Service	4,928	4,922	− 6	102,888	93,735	− 9,153
Radio Service	.....	505	+ 505	24,055	99,052	+ 74,997
Steamboat-Inspection Service	259,142	253,335	− 5,807	593,860	641,057	+ 47,197
Lighthouse Service	2,870	2,349	− 521	1,116,460	965,747	−150,715
Naturalization Examiners Service	.....	322	+ 322	329,908	287,425	− 42,483
Clerks of courts:						
Naturalization forms	1,262	1,196	− 66	1,109,950	1,131,250	+ 21,300
Books of certificates of naturalization	[a] 1,953	[b] 2,180	+ 227	.....	.....	.....
Miscellaneous	33,071	20,101	−12,970	1,023,550	983,000	− 40,550
Total	315,203	[c] 298,044	−17,159	8,093,849	8,330,606	+236,757

[a] 29 books of 5 certificates each, 214 books of 10 certificates each, 400 books of 25 certificates each, and 1,310 books of 50 certificates each, or a total of 1,953 books, containing 77,785 certificates.

[b] 200 books of 10 certificates each, 400 books of 25 certificates each, and 1,580 books of 50 certificates each, or a total of 2,180 books, containing 91,000 certificates.

[c] Includes 253,052 pamphlets furnished to local and supervising inspectors of steamboats and collectors of customs pertaining to the enforcement of the steamboat laws and regulations, against 258,444 in 1912.

PRINTED STATIONERY.

There were filled during the year 729 requisitions for printed stationery, 360 of which were from offices and bureaus of the Department in Washington and 369 from the outside services. To fill the requisitions from the outside services required the sending out of 1,075 packages, bags, and boxes, weighing 45,836 pounds, or about 23 tons.

The following statement gives the quantity of each class of printed stationery supplied by the Division:

Class.	Number.	Class.	Number.
Envelopes (white, 2,843,800; manila, 1,425,850)	4,269,650	Stenographer's notebooks	7,700
Letterheads	2,038,750	Blank books	5,190
Memorandum sheets	3,145,800	Blank forms	222,473
Embossed letterheads	62,750	Index cards	529,250
Embossed envelopes	32,295	Guide cards	131,470
		Vertical folders	47,800

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Adding the amount of matter sent out in filling requisitions for blank books and forms to the amount sent out in filling requisitions for printed stationery, it will be seen that the Division forwarded during the year 15,609 packages, boxes, and bags, weighing 317,520 pounds, or 159 tons, against 14,967, weighing 293,652 pounds, or 147 tons, in 1912.

WORK OF EDITORIAL SECTION.

The work of the editorial section during the past year involved the editing or examination and preparation for the printer of 72,980 folios of manuscript, a decrease of 2,628 from the preceding year; the reading and revising of 41,015 printed pages, an increase of 1,678, and the indexing of 1,088 pages. These figures do not include reprints of publications that did not require revision, or job work and blank forms, all of which received careful scrutiny in this Division; neither do they include the reading and revising of proofs of circular letters and other work done on duplicating machines.

About three-fourths of the allotment to the Department for printing and binding is expended for its publications, and to obtain for this work the maximum of product for the minimum of expenditure is one of the more important functions of the Division of Publications. This can best be effected by carefully editing all manuscripts, which, besides determining the form and style of the publications, should be done with a view to avoiding expensive correction and revision in proofs and to the elimination of matter that is unnecessary or not deemed worthy of publication by the Department. It is not always possible with the present small force of editorial clerks to give manuscripts the thorough critical reading that they should have before they are transmitted to the printer. It is believed, however, that the increase of one clerk submitted in the estimate for the personnel of the Division for the fiscal year 1915 will, if granted, result in a more efficient handling of this class of work.

DUPLICATING WORK.

The section for duplicating typewritten letters and circulars, established in this Division during the latter part of the fiscal year 1912, was in operation during the whole of the past year. This section filled over 600 separate requisitions, requiring the duplicating of 882 pages, of which 677,746 copies were printed.

The need for some means quickly to duplicate circulars, letters of instruction, etc., which repeatedly arises in all bureaus, especially those with extensive outside services, is fully met by the establishment of the duplicating plant in this Division. The centralization of the work in one of the offices of the Department, where a trained force and an adequate equipment is maintained, has proved a matter not only of great convenience but also of economy. The inexpensive process employed permits the duplication of many forms, intended for temporary use only, which would not justify the expense of printing, while the prompt execution of the work is also as a rule an element of great importance. The service has been freely utilized by the bureaus and offices of the Department, and its value is amply attested by the constantly increasing demands made upon it.

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PUBLICATIONS ISSUED.

There is submitted on the following pages a list of publications emanating from the Department during the last fiscal year. This list includes publications of the permanent Census but not those of the Thirteenth Census. It does not include publications ordered during the year but not delivered by the Public Printer up to June 30, 1913, while those ordered prior to July 1, 1912, but delivered during the last fiscal year appear therein. In other words, the list is confined to publications becoming available for distribution or use during the year, and includes congressional documents emanating from the Department and for the printing of which the Department's allotment for printing and binding usually was drawn upon, in accordance with the provisions of Public Resolution No. 13, approved March 30, 1906.

The publications listed under the Children's Bureau, the Immigration and Naturalization Bureau, and the Labor Bureau are those issued with the imprint of the Department of Commerce and Labor before those bureaus were transferred to the new Department of Labor, created by the act approved March 4, 1913. The publications appearing under the head of Foreign and Domestic Commerce Bureau include also those issued during the year by the Manufactures Bureau and Statistics Bureau, which were consolidated into the Bureau of Foreign and Domestic Commerce by the act approved August 23, 1912.

PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS.

OFFICE OF THE SECRETARY.

Title and description.	Pages.	Edition.	Cost.
10th annual report of Secretary, 1912. 8vo	144	2,500	$547.19
Same [press proofs]	*144	1,950	185.12
Reports of Department, 1912. Report of Secretary and reports of bureaus [consolidated]. [Printed also as H. doc. 961, 62d Cong. 3d sess.] 8vo	881	500	1,418.75
Annual report of Chief, Appointment Division, 1912. 8vo	38	500	105.94
Annual report of Chief, Division of Publications, 1912. 8vo	35	300	166.95
List of publications of Department available for distribution. 8th edition. July 1, 1912. 8vo	63	500	53.75
Same [reprint]	63	500	21.04
Same. 9th edition. May 1, 1913. 8vo	63	1,000	206.09
Department circulars [all 4to]:			
96. Regulations governing issuance of copies of accounts, records, or files. Oct. 18, 1905. [Reprint, with footnote.]	1	500	3.06
236—Bureau of Navigation and Steamboat-Inspection Service [supersedes 115, June 8, 1906; 129, Sept. 7, 1906; 188, Mar. 25, 1909; 190, Apr. 7, 1909; 191, Apr. 14, 1909; 207, June 9, 1910; 208, June 11, 1910; 225, Apr. 12, 1911; and 226, May 22, 1911; also Bureau circular 5, Steamboat-Inspection Service, July 8, 1907]. Regulation of motor boats. Feb. 15, 1912. [Reprint.]	4	50,000	152.93
239—Bureau of Navigation. Assistance and salvage [at sea]. Aug. 6, 1912	1	2,200	7.46
240—Bureau of Navigation. Registry of foreign-built vessels. Aug. 30, 1912	2	3,000	14.30
241—Bureau of Navigation [supersedes 227, June 15, 1911]. Regulations for radio apparatus and operators on steamers. Sept. 5, 1912	7	4,200	65.82
Same. 2d edition	7	1,500	21.13
Same [reprint]	7	500	10.75
242. Oaths to expense accounts. Sept. 6, 1912	1	5,000	14.83
243 [supersedes 224, Apr. 1, 1911]. Regulations governing selection and appointment of persons certified directly to field officers of Department by district secretaries of Civil Service Commission. Oct 24, 1912	6	1,500	36.56
244 [amends 242, Sept. 6, 1912]. Oaths to expense accounts. Mar. 17, 1913	1	1,500	6.51

*Leaves.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

OFFICE OF THE SECRETARY—Continued.

Title and description.	Pages.	Edition.	Cost.
Department circulars—Continued.			
245—Bureau of Navigation and Steamboat-Inspection Service [supersedes 233, Nov. 21, 1911]. Manning of inspected vessels. Mar. 18, 1913.	2	5,500	$17.87
Same [reprint]	2	1,000	3.73
246—Bureau of Fisheries. Regulations for protection of fur-bearing animals in Alaska. Mar. 26, 1913	3	4,500	26.26
247—Bureau of Navigation [supersedes 169, June 3, 1908, and 223, Mar. 17, 1911]. Rules and regulations to promote safety of life on navigable waters during regattas or marine parades. May 19, 1913	2	1,600	11.53
Opinions of Solicitor of Department [Aug. 1908–Aug. 1912] dealing with workmen's compensation under act granting to certain employees of United States right to receive from it compensation for injuries sustained in course of their employment, approved May 30, 1908. 8vo	646	1,000	2,510.87
Compensation for injuries to employees of United States arising from accidents, Aug. 1, 1908–June 30, 1911, report of operations under act of May 30, 1908. 8vo	234	1,000	1,779.57
Estimate of [deficiency] appropriation of $27,880 to carry out laws enacted concerning radio communication and international convention upon subject ratified at present session of Congress. July 31, 1912. [Printed as S. doc. 888, 62d Cong. 2d sess.] 8vo	2	(a)	4.37
Communication relative to immediate appropriation to enable Bureau of Foreign and Domestic Commerce to carry out provisions of law [relating to investigation of cost of production abroad of dutiable articles, etc.]. Jan. 15, 1913. [Printed as S. doc. 1009, 62d Cong. 3d sess.] 8vo	3	(a)	6.11
Letter relating to international conference and promotion of safety to life at sea. Apr. 15, 1913. [Printed as S. doc. 8, 63d Cong. 1st sess.] 8vo	8	300	2.61
Same [reprint]	8	300	2.73
Estimate of [deficiency] appropriation to carry into effect provisions of H. 19403, authorizing Director of Census to collect and publish statistics of cotton. July 22, 1912. [Printed as H. doc. 876, 62d Cong. 2d sess.] 8vo	2	(a)	3.68
Estimates of [deficiency] appropriations with reference to additional aids to navigation in Lighthouse Service. July 27, 1912. [Printed as H. doc. 893, 62d Cong. 2d sess.] 8vo	1	(a)	2.46
Letter acknowledging receipt of resolution in regard to high price of anthracite coal [and stating that information will be furnished as soon as possible]. Aug. 2, 1912. [Printed as H. doc. 896, 62d Cong. 2d sess.] 8vo	1	(a)	.....
Letter transmitting, with favorable recommendation, draft of bill authorizing purchase of land for lighthouse purposes at Port Ferro Light Station, P. R. Dec. 3, 1912. [Printed as H. doc. 994, 62d Cong. 3d sess.] 8vo	2	(a)	4.00
Detailed statement of disbursements made by Department, Dec. 1, 1911–Nov. 30, 1912. Dec. 3, 1912. [Printed as H. doc. 1004, 62d Cong. 3d sess.] 8vo	90	(a)	375.16
Letter inviting attention to certain items of proposed legislation relating to Lighthouse Service for fiscal year 1914, contained in book of estimates of appropriations. Dec. 10, 1912. [Printed as H. doc. 1111, 62d Cong. 3d sess.] 8vo	3	(a)	7.08
Statement of expenses incurred from appropriations for regulating immigration, fiscal year 1912. Dec. 10, 1912. [Printed as H. doc. 1120, 62d Cong. 3d sess.] 8vo	2	(a)	97
Estimates of deficiencies in appropriations for Department, fiscal year 1913. Dec. 11, 1912. [Printed as H. doc. 1152, 62d Cong. 3d sess.] 8vo	6	(a)	22
Amended estimate for pay, etc., of officers and men, vessels, Coast and Geodetic Survey, fiscal year 1914. Dec. 16, 1912. [Printed as H. doc. 1176, 62d Cong. 3d sess.] 8vo	2	(a)	26
Statement of expenses incurred by officers and employees of Department, June 30–Dec. 1, 1912, while in attendance upon societies or conventions. Jan. 2, 1913. [Printed as H. doc. 1214, 62d Cong. 3d sess.] 8vo	3	(a)	19.08
Estimate of appropriation, fiscal year 1913, for establishment and operation of immigrant station in Chicago, Ill., etc. Jan. 6, 1913. [Printed as H. doc. 1230, 62d Cong. 3d sess.] 8vo	2	(a)	4.52
Communication reporting claims for damages which have been considered, adjusted, and determined by Commissioner of Lighthouses in favor of Union Steamship Co. and in favor of S. E. Slade Lumber Co. Jan. 15, 1913. [Printed as H. doc. 1269, 62d Cong. 3d sess.] 8vo	2	(a)	3.71
Amendment to estimate for printing and binding for Department, [fiscal] year 1914. Feb. 1, 1913. [Printed as H. doc. 1327, 62d Cong. 3d sess.] 8vo	3	(a)	6.11
Letter transmitting list of useless papers on file in Department and recommending that they be destroyed. Feb. 4, 1913. [Printed as H. doc. 1337, 62d Cong. 3d sess.] 8vo	5	(a)	12.58
Draft of bill to authorize Secretary to sell such technical, scientific, statistical, and other publications, issued by Department, as he may deem best for public interest. Feb. 4, 1913. [Printed as H. doc. 1338, 62d Cong. 3d sess.] 8vo	2	(a)	4.52
Estimate of appropriation for purchase of large testing machine for Bureau of Standards. Feb. 6, 1913. [Printed as H. doc. 1350, 62d Cong. 3d sess.] 8vo	2	(a)	3.78

(a) None printed for the Department.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

OFFICE OF THE SECRETARY—Continued.

Title and description.	Pages.	Edition.	Cost.
Letter referring [to] S. 8369, to donate old exchange building in Charleston to Daughters of American Revolution, and advising Congress that building is now used by Lighthouse Service. Feb. 12, 1913. [Printed as H. doc. 1388, 62d Cong. 3d sess.] 8vo	1	(a)	$2.31
Communication transmitting sworn statement of value of personal effects of officers and crew of lighthouse tender Armeria, wrecked May 20, 1912, and recommending appropriation to pay same. Feb. 13, 1913. [Printed as H. doc. 1393, 62d Cong. 3d sess.] 8vo	23	(a)	54.86
Letter transmitting list of useless papers on file in Department and requesting authority to destroy same. Feb. 20, 1913. [Printed as H. doc. 1409, 62d Cong. 3d sess.] 8vo	5	(a)	22.20
Statement of number of documents received and number distributed by Department, calendar year 1912. Feb. 21, 1913. [Printed as H. doc. 1411, 62d Cong. 3d sess.] 8vo	6	(a)	44.46
Letter asking authority to pay rental for refrigerator plant in one of buildings of Department out of appropriation for contingent expenses. Apr. 17, 1913. [Printed as H. doc. 32, 63d Cong. 1st sess.] 8vo	2	(a)	4.37
Letter with memorandum relative to authorization to enter into lease for rental of additional floor space for Bureau of Census and transferring Bureau of Census from its present quarters to new building for Department. Apr. 21, 1913. [Printed as H. doc. 34, 63d Cong. 1st sess.] 8vo	4	(a)	10.12
Letter recommending repeal of law authorizing reimbursement of official traveling and subsistence expenses of inspectors in Steamboat-Inspection Service. Apr. 26, 1913. [Printed as H. doc. 37, 63d Cong. 1st sess.] 8vo	2	(a)	3.63
Communication, Mar. 3, 1913, submitting sworn statement of Allan Simanson of value of his personal effects lost by wrecking of lighthouse tender Armeria, May 12, 1912. June 17, 1913. [Printed as H. doc. 86, 63d Cong. 1st sess.] 8vo	2	(a)	.....
Estimate of appropriation for purchase and operation of motor boat to be used in enforcement of laws relating to navigation and inspection of vessels. June 20, 1913. [Printed as H. doc. 95, 63d Cong. 1st sess.] 8vo	3	(a)	6.63
Estimate of appropriation for Bureau of Fisheries [in connection with protection of fisheries and fur-bearing animals of Alaska], fiscal year 1914. June 20, 1913. [Printed as H. doc. 96, 63d Cong. 1st sess.] 8vo	6	(a)	12.96

CENSUS BUREAU. b

Annual report of Director, 1912. 8vo	41	1,200	$140.44
Mortality statistics, [calendar year] 1909, 10th annual report with revised rates for intercensal years 1901–09 based upon census of 1910. 4to	810	5,000	14,389.03
Mortality statistics, [calendar year] 1910. (Bulletin 109.) 4to	191	1,000	159.86
Same, 1911. 1 text fig. (Bulletin 112.) 4to	142	4,000	2,162.44
Mortality statistics for 1911 [press notice]. Apr. 30, 1913. narrow fo	c 1	2,400	23.17
Infant and child mortality [press notice]. Apr. 30, 1913. narrow fo	c 1	1,200	20.21
Causes of death [press notice]. May 2, 1913. narrow fo	c 1	2,400	13.19
Statistics of cities, 1911 [press notice]. May 7, 1913. narrow fo	c 1	5,000	11.80
Summary of receipts from revenues, payments for cost of Government, and gross debt of cities, 1911 [press notice]. [May 8, 1913.] narrow fo	1	5,000	68.16
Financial statistics of cities having population of over 30,000, 1909; [by] Le Grand Powers. (Special reports.) 4to	279	5,500	6,215.52
Same, 1910. 4to	308	5,500	6,583.92
Circular of information concerning census publications. Oct. 1, 1912. 8vo.	13	2,000	64.06
Instructions to special agents, cotton statistics. July 1, 1912. 12mo	16	1,000	46.31
Same. June 1, 1913. 12mo	16	1,500	58.74
Instructions to clerks and special agents, statistics of cities having population of over 30,000, 1912, municipal finance. 16mo	187	500	473.93
Instructions to special agents, census of electrical industries, [1912]. 16mo	32	300	88.40
Report of quantity of leaf tobacco held by dealers and manufacturers, Oct. 1, 1912. Nov. 27, 1912. (Tobacco report 1.) [Semiannual.] 8vo	7	10,000	66.63
Supply and distribution of cotton, year ending Aug. 31, 1912. 3 text fig. (Bulletin 115.) 4to	31	44,000	1,043 81
Report on cotton ginning [by States and counties, 1909–12]. Dec. 31, 1912. large 8vo	14	3,700	233.39
Assessed valuation of property, basis of assessment, and taxes levied, 1910. [From Financial statistics of cities having estimated population of over 30,000 in 1910.] 4to	21	300	21.78
Forest products [1911 series], [compiled in cooperation with Department of Agriculture, Forest Service; all 8vo]:			
1. Pulp-wood consumption, 1911. May 24, 1913. 1 text fig	10	4,000	59.94
2. Lumber, lath, and shingles, 1911. May 12, 1913	45	55,000	954.87
3. Slack cooperage stock, 1911. May 7, 1913	10	5,000	62.98
4. Excelsior, 1911. May 5, 1913	4	3,000	16.86
5. Veneers, 1911. June 5, 1913	8	4,000	42.33

a None printed for the Department.
b List does not include publications of the Thirteenth Census.
c Leaves.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

CENSUS BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Forest products, etc.—Continued.			
6. Light cooperage stock, 1911. May 17, 1913	12	4,000	$80.26
7. Wood distillation, 1911. June 16, 1913	6	3,000	21.75
8. Crossties purchased, 1911. May 12, 1913	8	6,000	64.62
9. Poles purchased, 1911. June 18, 1913	8	6,000	42.40
Official register, 1913, key to abbreviations. 4to	23	200	136.69

CHILDREN'S BUREAU.[a]

Children's Bureau, establishment, [etc.]. 8vo	5	1,000	$16.30
Same [reprint]	5	1,000	4.69
Same [reprint]	5	1,000	5.69
Birth registration, aid in protecting lives and rights of children, necessity for extending registration area. 1 text fig. (Monograph 1.) 8vo	24	2,500	107.34
Same [reprint]	24	2,500	32.53
Same [reprint]	24	2,500	32.38

COAST AND GEODETIC SURVEY.

Annual report of Superintendent, 1912. portfolio of 9 maps. 1 diag. [Printed also as H. doc. 966, 62d Cong. 3d sess.] 8vo	106	2,000	$1,406.30
Regulations and instructions for government of Survey. 8vo	83	800	506.10
Geodetic operations in United States, 1909–12, report to 17th conference of International Geodetic Association [Hamburg, Germany, Sept. 1912, with list of geodetic publications by Survey since Jan. 1, 1909]; by O. H. Tittmann. 3 pl. 4to	18	500	90.58
United States coast pilot, Atlantic coast: pts. 1, 2, St. Croix River to Cape Ann [supplement to 3d edition]. May 27, 1913. large 8vo	5 leaves	1,000	23.07
Same: pt. 3, Cape Ann to Point Judith [supplement to 3d edition]. May 20, 1913. large 8vo	4 leaves	1,000	16.67
Same: pt. 4, Point Judith to New York [supplement to 5th edition]. Apr. 22, 1913. large 8vo	8 leaves	1,000	30.13
Same: pt. 5, New York to Chesapeake Bay entrance [supplement to 4th edition]. May 12, 1913. large 8vo	7 leaves	1,000	28.99
Same: pt. 6, Chesapeake Bay and tributaries; [compiled by Edwin H. Tillman and John Ross]. 4th edition [revised by Herbert C. Graves]. 2 maps, 5 text fig. large 8vo	162	1,200	1,187.31
Same: pt. 8, Gulf of Mexico from Key West to Rio Grande [supplement to 3d edition]. May 12, 1913. large 8vo	9 leaves	1,000	39.07
United States coast pilot, Pacific coast: California, Oregon, and Washington [supplement to 2d edition]. May 12, 1913. large 8vo	8 leaves	1,000	28.33
Same: Alaska, pt. 1, Dixon Entrance to Yakutat Bay, with inland passage from Juan de Fuca Strait to Dixon Entrance. 5th edition. 9 pl. 5 maps, 4 text fig. [Reprint.] large 8vo	239	2,000	1,123.66
Same, supplement. May 20, 1913. large 8vo	12 leaves	1,000	45.16
Inside route pilot, New York to Key West, 1912; [by Herbert C. Graves and W. E. Parker]. 8 maps in pocket. large 8vo	62	2,500	591.71
Inland waterway, Atlantic coast. large 8vo	2	3,000	14.68
Catalogue of charts, coast pilots, and tide tables, 1912. 86 text fig. 4to	228	2,500	1,797.08
Results of observations made at magnetic observatory at Vieques, P. R., 1909–10; by Daniel L. Hazard. 10 charts. 4to	94	600	1,194.61
Same, Sitka, Alaska, 1909–10; by Daniel L. Hazard. 21 charts. 4to	96	600	1,179.32
Same, Tucson, Ariz., 1909–10; by Daniel L. Hazard. 5 charts, 2 text fig. 4to	59	600	712.09
Survey of oyster bars, description of boundaries and landmarks, and report of work of Survey in cooperation with Bureau of Fisheries and Maryland Shell Fish Commission; by C. C. Yates [each large 8vo, with large map]:			
Talbot County, Md	250	500	1,156.27
Dorchester County, Md	180	400	808.19
Texas-California arc of primary triangulation; by William Bowie. 2 pl. 6 p. of pl. 10 text fig. (Special publication 11.) 4to	141	1,700	1,132.67
Effect of topography and isostatic compensation upon intensity of gravity, 2d paper; by William Bowie. 5 maps in pocket. (Special publication 12.) 4to	28	2,000	602.81
California-Washington arc of primary triangulation; by A. L. Baldwin. 7 text fig. (Special publication 13.) 4to	78	1,600	685.53
Determination of time, longitude, latitude, and azimuth; by William Bowie. 5th edition. 8 pl. 18 p. of pl. (Special publication 14.) 4to	177	2,000	2,044.42
Statement of expenditures in Survey, fiscal year 1912. Jan. 16, 1913. [Printed as H. doc. 1271, 62d Cong. 3d sess.] 8vo	14	(c)	110.30

[a] List does not include publications issued by the Children's Bureau after it became a part of the Department of Labor.

[b] Leaves.

[c] None printed for the Department.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

CORPORATIONS BUREAU.

Title and description.	Pages.	Edition.	Cost.
[9th] annual report of Commissioner, 1912. 8vo	24	2,500	$136.04
Same [press proofs]	[a] 24	1,100	96.02
[Report on] Cotton tare. Sept. 3, 1912. 8vo	63	2,500	282.82
Same [press proofs of letter of submittal]	[a] 10	1,800	20.02
Taxation of corporations: pt. 4, Western Central States, report on system of taxing manufacturing, mercantile, transportation, and transmission corporations in Minnesota, North Dakota, South Dakota, Iowa, Nebraska, Kansas, and Missouri [with bibliographies]. Nov. 29, 1912. 1 tab. 8vo	158	2,500	797.75
Lumber industry: pt. 1, Standing timber. Jan. 20, 1913. 2 maps. 8vo	325	2,500	5,139.89
Same [press proofs of letter of submittal]	[a] 4	2,100	24.87
Report on transportation by water in United States: pt. 1, General conditions of transportation by water. July 12, 1909. 1 map. [Reprint.] 8vo	632	500	267.26
Same: pt. 2, Water-borne traffic. July 19, 1909. 5 maps. [Reprint.] 8vo	426	500	176.26
Same: pts. 4 and 5, Control of water carriers by railroads and by shipping consolidations. Dec. 23, 1912. 4 maps, 5 diag. 8vo	119	2,500	823.87
Same [press proofs of letter of submittal]	[a] 4	1,550	24.43
Report on water-power development in United States: pt. 1, Physical conditions and economic aspects of water power; pt. 2, Concentration of ownership and control; pt. 3, Water power and the public. Mar. 14, 1912. 7 charts, 9 maps. [Reprint.] 8vo	240	800	382.19
Report on steel industry: pt. 1, Organization, investment, profits, and position of United States Steel Corporation. July 1, 1911. tab. [Reprint.] 8vo	446	500	161.93
Same: pt. 3, Cost of production, full report. May 6, 1913. 8vo	603	2,500	3,553.64
Same [press proofs of letter of submittal]	[a] 7	2,200	40.62
Report on tobacco industry: pt. 2, Capitalization, investment, and earnings. Sept. 25, 1911. [Reprint.] 8vo	365	500	128.46
[Report on] International Harvester Co. Mar. 3, 1913. 8vo	408	2,500	2,213.77
Summary of report on International Harvester Co. Mar. 3, 1913. 8vo	47	2,500	244.55
Same [press proofs]	[a] 47	1,675	69.39

FISHERIES BUREAU.

Annual report of Commissioner, 1912. ([B. F. doc. 772.]) 8vo	69	1,500	$379.53
Bulletin, vol. 30, 1910. 57 pl. 115 text fig. [Printed also as H. doc. 1439, 61st Cong. 3d sess.] large 8vo	405	250	500.01
Same [title-page, contents, and index]. large 8vo	11	500	
Bulletin, vol. 31, 1911: pt. 1. 1 chart, 3 maps, 270 text fig. [Printed also as H. doc. 176, 62d Cong. 2d sess.] large 8vo	544	1,500	5,947.62
Same: pt. 2. [Printed also as H. doc. 176, 62d Cong. 2d sess.] large 8vo	318	1,500	
United States Bureau of Fisheries, its establishment, functions, organization, resources, operations, and achievements [paper presented before 4th International Fishery Congress, Washington, Sept. 22–26, 1908]; [by Hugh M. Smith]. [2d edition.] [May,] 1910. 14 pl. ([B. F. doc. 725.]) [From Bulletin, vol. 28.] [Reprint.] large 8vo	49	500	88.14
Salmon fisheries of Pacific coast; [by John N. Cobb]. (B. F. doc. 751.) [Reprint.] 8vo	181	500	56.79
Studies on reproduction and artificial propagation of fresh-water mussels [with bibliography; by George Lefevre and Winterton C. Curtis]. May 10, 1912. 12 p. of pl. 4 text fig. ([B. F.] doc. 756.) [Printed as H. doc. 907, 62d Cong. 2d sess.] large 8vo	99	[b]	.....
Review of cephalopods of western North America [with bibliography; by S. Stillman Berry]. July 24, 1912. 25 pl. 18 text fig. ([B. F.] doc. 761.) [From Bulletin, vol. 30.] large 8vo	72	1,250	891.82
Some hydroids of Beaufort, N. C. [with bibliography; by C. McLean Fraser]. July 23, 1912. 52 text fig. ([B. F.] doc. 762.) [From Bulletin, vol. 30.] large 8vo	53	1,250	420.35
Preliminary examination of halibut fishing grounds of Pacific coast; by A. B. Alexander; with Introductory notes on halibut fishery, by H. B. Joyce. (B. F. doc. 763.) 8vo	58	1,250	242.68
Notes on new species of flatfish from off coast of New England; [by William C. Kendall]. Aug. 13, 1912. 1 pl. ([B. F.] doc. 764.) [From Bulletin, vol. 30.] large 8vo	8	1,250	65.12
Mussel resources of Holston and Clinch Rivers of eastern Tennessee, investigation by J. F. Boepple; by R. E. Coker. (B. F. doc. 765.) 8vo	13	1,250	67.27
Alaska fisheries and fur industries in 1911. (B. F. doc. 766.) 8vo	101	1,500	453.59
Age at maturity of Pacific coast salmon of genus Oncorhynchus; by Charles H. Gilbert. Mar. 20, 1913. 17 pl. ([B. F.] doc. 767.) [From Bulletin, vol. 32.] large 8vo	24	1,250	441.61
New species of trout from Lake Tahoe; by John Otterbein Snyder. Dec. 31, 1912. (B. F. doc. 768.) [From Bulletin, vol. 32.] large 8vo	6	1,500	33.78
Condition and extent of natural oyster beds and barren bottoms of Mississippi Sound, Ala.; by H. F. Moore. 1 pl. 4 p. of pl. 1 map, 1 text fig. (B. F. doc. 769.) 8vo	63	1,250	442.17

[a] Leaves. [b] None printed for the Department.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

FISHERIES BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Distribution of fish and fish eggs, fiscal year 1912. (B. F. doc. 770.) 8vo..	108	1,250	$205.14
Identification of glochidia of fresh-water mussels; by Thaddeus Surber. 1 pl. 2 p. of pl. (B. F. doc. 771.) 8vo	12	1,250	112.21
Description of new darter from Maryland; by Lewis Radcliffe and William W. Welsh. May 24, 1913. 1 pl. ([B. F.] doc. 773.) [From Bulletin, vol. 32.] large 8vo	4	1,500	35.04
Condition and extent of natural oyster beds and barren bottoms of Mississippi east of Biloxi; by H. F. Moore. 6 p. of pl. 1 map. (B. F. doc. 774.) 8vo	48	1,250	350.16
Sense of smell in fishes [with bibliography]; by G. H. Parker and R. E. Sheldon. May 3, 1913. ([B. F.] doc. 775.) [From Bulletin, vol. 32.] large 8vo	14	1,500	58.78
Condition of mussel fishery of Illinois River in 1912; [by Ernest Danglade]. Sept. 20, 1912. (Economic circular 2.) 8vo	4	250	9.12
Mussels of central and northern Minnesota; [by Charles B. Wilson and Ernest Danglade]. Oct. 26, 1912. (Economic circular 3.) 8vo	6	500	12.19
Truth about fur seals of Pribilof Islands; statement of David Starr Jordan and George A. Clark. Dec. 20, 1912. (Economic circular 4.) 8vo	7	1,200	21.48
Artificial propagation of the diamond-back terrapin; [by W. P. Hay and H. D. Aller]. June 24, 1913. 3 text fig. (Economic circular 5.) 8vo	14	2,000	54.43
Regulations for protection of fur-bearing animals in Alaska. Mar. 8, 1911. (Alaska Fisheries Service circular 1.) [Reprint.] 4to	1	1,000	2.92
Laws and regulations for protection of fisheries of Alaska. Mar. 10, 1911. (Alaska Fisheries Service circular 2.) [Reprint.] 4to	5	1,000	11.80
Extracts from regulations of Mar. 8, 1911, for protection of fur-bearing animals in Alaska. 1 text fig. narrow 16mo	4	2,000	16.43
Artificial propagation of lake trout, grayling, and whitefish, 1903. 10 pl. 2 text fig. [From Fish manual.] [Reprint.] 8vo	32	1,000	56.16
Artificial propagation of Atlantic salmon, rainbow trout, and brook trout, 1900. 13 pl. 1 map, 14 text fig. [From Fish manual.] [Reprint.] 8vo	76	500	77.84
Same [reprint]	76	1,000	103.61
Artificial propagation of black basses, crappies, and rock bass, 1900. 3 pl. 1 map, 3 text fig. [From Fish manual.] [Reprint.] 8vo	19	1,000	32.41
Statement of quantities and values of certain fishery products landed at Boston and Gloucester, Mass., by American fishing vessels [issued monthly, May, 1912–May, 1913, 13 numbers, each 1 p. oblong large 8vo; statistical bulletins 274–281, 284, 285, 287, 288, 290]	13	3,275	345.27
Statement, by months, of quantities and values of certain fishery products landed at Boston and Gloucester, Mass., by American fishing vessels, [calendar] year 1912. (Statistical bulletin 282.) oblong large 8vo	1	500	32.02
Statement, by fishing grounds, of quantities and values of certain fishery products landed at Boston and Gloucester, Mass., by American fishing vessels, [calendar] year 1912. (Statistical bulletin 283.) oblong large fo..	1	500	42.80
Oyster industry of Maryland and Virginia, 1912 [and Comparative statistics of oyster product of Maryland and Virginia, 1880–1912]. (Statistical bulletin 286.) narrow fo	1	2,000	36.78
Oyster industry of Gulf States, 1911 [and Comparative statistics of oyster product of Gulf States, 1880–1911]. (Statistical bulletin 273.) oblong fo..	1	1,750	56.84

FOREIGN AND DOMESTIC COMMERCE BUREAU.

Annual report of Chief [Bureau of Manufactures], 1912. 8vo	11	1,000	$31.08
Daily consular and trade reports [issued daily except Sundays and legal holidays, July 1, 1912–June 30, 1913, 305 issues, 16–32 p. each]. fl. 8vo	6,528	6,100,000	57,300.78
Same, [title-page and index to] nos. 77–153 [series 1912]; Apr.–June, 1912. [Quarterly.] 8vo	37	1,200	226.71
Same, [title-page and index to] nos. 154–230 [series 1912]; July–Sept. 1912. [Quarterly.] 8vo	38	1,200	223.60
Same, [title-page and index to] nos. 231–307 [series 1912]; Oct.–Dec. 1912. [Quarterly.] 8vo	35	1,200	222.11
Same, [title-page and index to] nos. 1–74 [series 1913]: Jan.–Mar. 1913. [Quarterly.] 8vo	35	700	252.89
Foreign tariff notes, no. 7, with index for nos. 1–7. [From Daily consular and trade reports, Apr. 9–June 27, 1912.] 8vo	56	1,000	83.89
Same, no. 8. [From Daily consular and trade reports, July–Sept. 1912.] 8vo.	32	1,000	44.29
Same, no. 9. [From Daily consular and trade reports, Oct.–Dec. 1912.] 8vo.	32	750	58.39
Foreign commerce and navigation of United States, year ending June 30, 1912. [Printed also as H. doc. 957, 62d Cong. 3d sess.] 4to	1,342	1,700	28,245.00
Separates reprinted from Foreign commerce and navigation, 1912 [all 4to]:			
Annual review of foreign commerce of United States and summary tables of commerce, 1912	58	250	68.29
Imports and exports of gold and silver and imports and exports of merchandise, by countries and customs districts, 1912. [Tables 1–2.]	54	150	37.98
Imports of merchandise by articles and countries, 1908–12. [Table 3.]	270	500	74.86
Imports of merchandise [by articles and customs districts, 1912, and summary, by articles, 1910–12], 1912. [Tables 4–5.]	120	200	19.43

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

FOREIGN AND DOMESTIC COMMERCE BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Separates reprinted from Foreign commerce and navigation, 1912—Con.			
Exports of domestic merchandise, by articles and countries, 1908–12. [Table 6.]	324	600	$105.06
Exports of domestic merchandise [by articles and customs districts, 1912, and summary, by articles, 1910–12], 1912. [Tables 7–8.]	77	300	20.10
Imported merchandise entered for consumption in United States and duties collected thereon, 1912: Total values of imported merchandise entered for consumption, by customs districts and ports. [Tables 15–16.]	81	750	82.85
Drawback paid on articles exported, 1912. [Tables 17–18.]	20	160	13.43
Imports and exports of merchandise by countries and principal articles, 1908–12. [Table 19.]	108	300	24.51
Commerce of noncontiguous territory of United States with United States and foreign countries, 1912. [Tables 22–55.]	26	150	9.09
Statistical abstract of United States, 1912. no. 35. [Printed also as H. doc. 960, 62d Cong. 3d sess.] 8vo	836	2,400	5,266.51
Statistical record of progress of United States, 1880–1912, and monetary, commercial, and financial statistics of principal countries. Aug. 1912. [From Statistical abstract, 1912.] 8vo	94	1,000	110.82
Monthly summary of commerce and finance of United States [May, 1912–Apr. 1913, 12 numbers; printed also as H. doc. 151, pt. 11–12, 62d Cong. 2d sess., and H. doc. 938, pt. 1–10, 62d Cong. 3d sess.; all 4to]:			
May, 1912; no. 11, series 1911–12	161	2,650	1,523.36
June, 1912; no. 12, series 1911–12 [includes title-page and contents for vol. 19]	172	2,675	1,701.14
July, 1912; no. 1, series 1912–13	133	3,000	2,159.75
Aug. 1912; no. 2, series 1912–13	133	3,000	2,119.44
Sept. 1912; no. 3, series 1912–13	131	3,000	2,139.24
Oct. 1912; no. 4, series 1912–13	104	2,750	1,406.29
Nov. 1912; no. 5, series 1912–13	104	2,750	1,341.49
Dec. 1912; no. 6, series 1912–13	173	2,800	2,638.62
Jan. 1913; no. 7, series 1912–13	104	2,800	1,344.23
Feb. 1913; no. 8, series 1912–13	104	2,709	1,349.94
Mar. 1913; no. 9, series 1912–13	104	2,750	1,350.38
Apr. 1913; no. 10, series 1912–13	104	2,700	1,354.82
Advance sheets from Monthly summary of commerce and finance, showing details of imports and exports by articles [June, 1912–May, 1913, except July, Aug. and Sept. 1912, 9 numbers, 32–55 p. each]. 4to	317	6,050	3,836.90
Monthly summary of internal commerce of United States. [From Monthly summary of commerce and finance; May, 1912–June, 1912, 2 numbers, 45 and 46 p.] 4to	91	890	1,381.29
Calendar year statements, imports and domestic exports of merchandise, by great groups, 1903–12; summary of imports and domestic exports of merchandise, by articles, 1902–12; total values of imports into and exports from United States, [of] merchandise by calendar years 1866–1912, by countries [and] customs districts 1902–12, by months July, 1866–Dec. 1912, [of] gold and silver by calendar years 1866–1912; receipts and disbursements of Government, calendar years 1867–1912. [From Monthly summary of commerce and finance, Dec. 1912.] 4to	49	100	19.24
Total values of imports and exports of United States [issued monthly, June, 1912–May, 1913, 12 numbers, 2 p. each]. 4to	24	9,350	164.24
Exports of domestic breadstuffs, cottonseed oil, food animals, meat and dairy products, cotton, and mineral oils [issued monthly, June, 1912–May, 1913, 12 numbers, 12 p. each; bull. 12, series 1911–12, and 1–11, series 1912–13]. 4to	144	14,270	1,977.17
Imported merchandise entered for consumption in United States and duties collected thereon during quarters ending Sept. 30 and Dec. 31, 1911, and Mar. 31, 1912. 4to	175	1,000	1,667.99
Same, quarters ending Sept. 30 and Dec. 31, 1911, and Mar. 31 and June 30, 1912. 4to	177	1,000	646.26
Same, quarter ending Sept. 30, 1912. 4to	85	1,000	1,042.52
Same, quarters ending Sept. 30 and Dec. 31, 1912. 4to	86	1,000	534.75
Sailing dates of steamships from principal ports of United States to ports in foreign countries [issued monthly, Aug.–Nov. 1912, 4 numbers, each 1 large p.; Dec. 1912–July, 1913, 8 numbers, each 15–20 l., narrow fo]	151	28,150	1,425.43
Cotton goods in Turkey: pt. 2, Saloniki and Smyrna; by Ralph M. Odell. (Special agents series 54, pt. 2.) 8vo	36	2,000	130.95
Same: pt. 3, Syria and Bagdad; by Ralph M. Odell and Emil Sauer. (Special agents series 54, pt. 3.) 8vo	48	700	146.05
English methods of dyeing, finishing, and marketing cotton goods; by J. M. Hause. (Special agents series 56.) [Printed also as H. doc. 872, 62d Cong. 2d sess.] 8vo	35	2,000	94.70
Shoe and leather trade in France and Switzerland; by Arthur B. Butman. (Special agents series 57.) [Printed also as H. doc. 902, 62d Cong. 2d sess.] 8vo	44	2,000	247.43

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

FOREIGN AND DOMESTIC COMMERCE BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Packing and marketing of cotton, study of present wasteful methods and suggestions for their improvement; by John M. Carson. 8 p. of pl. (Special agents series 58.) [Printed also as H. doc. 1175, 62d Cong. 3d sess.] 8vo	39	2,000	$263.07
Mining in Federated Malay States; by D. C. Alexander, jr. 5 text fig. (Special agents series 59.) [Printed also as H. doc. 901, 62d Cong. 2d sess.] 8vo.	25	2,000	113.67
Commercial organizations, results of investigation of promotive activities of 70 associations in United States; by E. A. Brand. (Special agents series 60.) [Printed also as H. doc. 1173, 62d Cong. 3d sess.] 8vo	48	2,000	148.51
Cuba as buyer and seller [with list of Bureau publications on Cuba]; by A. G. Robinson. (Special agents series 61.) [Printed also as H. doc. 1174, 62d Cong. 3d sess.] 8vo	32	2,000	171.61
Foreign credits, study of foreign credit problem with review of European methods of financing export shipments [with bibliography]; by Archibald J. Wolfe, with reports from American consular officers. (Special agents series 62.) 8vo	421	2,000	1,589.89
Shoe and leather trade in Scandinavia; by Arthur B. Butman. (Special agents series 63.) 8vo	38	2,000	215.46
Cotton goods in Egypt; by Ralph M. Odell. (Special agents series 64.) 8vo.	24	2,000	94.38
Chemical industries of Belgium, Netherlands, Norway, and Sweden; by Thomas H. Norton. (Special agents series 65.) 8vo	85	1,500	309.89
Electrical instruments and meters in Europe; by H. B. Brooks. 6 text fig. (Special agents series 66.) 8vo	88	1,000	256.41
Commerce and industries of Alaska, Hawaii, Porto Rico, and Philippine Islands; by A. G. Robinson. (Special agents series 67.) 8vo	116	1,000	579.87
Shoe and leather trade in Russia [including Finland]; by Arthur B. Butman. (Special agents series 68.) 8vo	23	1,500	133.28
Cotton goods in Canada; by W. A. Graham Clark. (Special agents series 69.) 8vo	50	700	193.97
Shoe and leather trade in Italy and Austria-Hungary; by Arthur B. Butman; with reports from American consular officers. (Special agents series 70.) 8vo	60	700	281.76
Cotton goods in Red Sea markets; by Ralph M. Odell. (Special agents series 71.) 8vo	64	700	216.01
Foreign markets for motor vehicles. (Special consular reports 53.) 8vo	143	2,000	563.84
Foreign trade in canned goods. (Special consular reports 54.) 8vo	192	2,000	871.14
Foreign trade in musical instruments. (Special consular reports 55.) 8vo.	102	2,000	377.99
Foreign trade in paints and varnishes. (Special consular reports 56.) 8vo.	72	2,000	326.37
New Zealand: Its resources, industries, and trade, with suggestions as to its development as market for American merchandise; by Henry D. Baker and other consular officers. map. (Special consular reports 57.) 8vo	220	2,000	710.40
Machine tools in Latin America. (Special consular reports 58.) 8vo	32	1,000	101.50
Development of motor-vehicle trade abroad. (Special consular reports 59.) [Supplementary to Foreign markets for motor vehicles, Special consular reports 53.] 8vo	70	1,500	243.21
Promotion of commerce, outline of service maintained by Bureau and other bureaus and offices of Government. (Miscellaneous series 6b.) [Revision of Miscellaneous series 6, Bureau of Manufactures.] 8vo	29	2,000	144.93
[Factors in foreign trade, Miscellaneous series 7], addendum [and changes]. 8vo	1	1,500	4.70
Commercial and agricultural organizations of United States. (Miscellaneous series 8.) [Prepared in cooperation with Department of Agriculture.] [Printed also as S. doc. 1109, 62d Cong. 3d sess.] 8vo	125	200	27.53
Sugar industry: Sugar cane and cane sugar in Louisiana, beet sugar data, and general tables; [by F. J. Sheridan]. 2 diag. (Miscellaneous series 9.) 8vo	135	500	876.24
American manufactures in foreign markets. (Miscellaneous series 11.) 8vo.	177	1,000	1,600.90
Supplement to [Customs] tariff of France. Sept. 1912. (Tariff series 25a.) 8vo	14	900	70.93
Customs tariff of Japan, revised to June, 1912; with introduction by Frank R. Rutter. (Tariff series 28.) 8vo	88	2,000	751.20
Foreign tariff systems and industrial conditions, report prepared at request of chairman of Committee on Ways and Means. 8vo	66	(a)	.....
Market for American boots and shoes in South Africa; by William A. Haygood. Mar. 17, 1913. (Confidential bulletin 19.) 8vo	8	1,500	22.10
Commercial relations of United States with foreign countries, calendar year 1910. [Printed also as H. doc. 1503, 61st Cong. 3d sess.] 8vo	99	100	595.61
Same, 1911. [Printed also as H. doc. 959, 62d Cong. 3d sess.] 8vo	185	100	1,273.08
Schedule E, classification of merchandise, with rates of duty, and laws and regulations governing preparation of quarter-yearly statements of imports entered for consumption in United States [with tariff act of Aug. 5, 1909, on imports into United States]. June 1, 1912. 8vo	261	1,400	882.94
Comparative ad valorem duties in United States and foreign countries. [From House report 5, 63d Cong. 1st sess.] 8vo	8	100	2.72

(a) None printed for the Department.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

IMMIGRATION AND NATURALIZATION BUREAU.[a]

Title and description.	Pages.	Edition.	Cost.
Annual report of Commissioner General of Immigration, 1912. 4 pl. 2 charts. 8vo	224	5,000	$2,167.88
Annual report of Chief of Division of Naturalization, 1912. 8vo	32	2,500	154.47
Annual report of Chief of Division of Information, 1912. 8vo	17	500	77.00
Annual report of William Williams, commissioner of immigration at New York, in reference to Ellis Island affairs, year ended June 30, 1912; presented by Mr. Lodge. Feb. 21, 1913. [Printed as S. doc. 1098, 62d Cong. 3d sess.] 8vo	16	(b)	.....
Immigration bulletin [issued monthly, May, 1912–Feb. 1913, 10 numbers, 4 p. each.] 4to	40	15,100	978.74
Immigration laws, rules of Nov. 15, 1911. 3d edition. 8vo	67	3,000	67.79
Same. 4th edition. 8vo	69	2,000	191.29
Amendments to rule 10 of immigration rules of Nov. 15, 1911 [concerning seamen]. Oct. 12, 1912. 8vo	3	5,000	19.45
Treaty, laws, and regulations governing admission of Chinese; regulations approved Apr. 18, 1910. Edition of Feb. 24, 1913, embodying amendments to rules 10, 19, and 26, also act approved Aug. 24, 1912. 8vo	63	3,000	84.10
Naturalization laws and regulations, Oct. 1, 1912. 8vo	31	5,000	93.45
Same [reprint]	31	3,000	42.10
Information as to immigration laws and their execution. Dec. 1912. 4to	2	3,000	16.36
Information concerning resources, products, and physical characteristics of South Atlantic States, comprising Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. (Agricultural opportunities 2.) 8vo	36	10,000	204.00
Same, North Central States, western group, comprising Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. (Agricultural opportunities 4.) 8vo	32	10,000	174.92
Same, South Central States, comprising Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas. (Agricultural opportunities 5.) 8vo	36	10,000	202.55
Decision of Supreme Court approving deportation on departmental warrant of immoral Chinese woman. June 25, 1912. 8vo	7	325	19.16
Directory of courts having jurisdiction in naturalization proceedings. 2d edition, July, 1912. 8vo	83	200	514.07
Memorandum prepared by Secretary as basis for his decision in matter of foreign-born minor children of naturalized citizens. 8vo	10	100	27.36
Constitution of United States. [Reprint.] 24mo	40	15,000	135.06

LABOR BUREAU.[c]

Bulletins [all 8vo]:			
101. Care of tuberculous wage earners in Germany [with bibliography; by Frederick L. Hoffman]. July 1, 1912. (Workmen's insurance and compensation series 1.) [Printed also as H. doc. 853, 62d Cong. 2d sess.]	183	9,000	$1,409.26
102. British national insurance act, 1911. July 15, 1912. (Workmen's insurance and compensation series 2.) [Printed also as H. doc. 918, 62d Cong. 2d sess.]	87	9,000	560.68
103. Sickness and accident insurance law of Switzerland. Aug. 1, 1912. (Workmen's insurance and compensation series 3.) [Printed also as H. doc. 919, 62d Cong. 2d sess.]	27	9,000	194.46
104. Lead poisoning in potteries, tile works, and porcelain enameled sanitary ware factories; [by Alice Hamilton]. Aug. 7, 1912. (Industrial accidents and hygiene series 1.) [Printed also as H. doc. 920, 62d Cong. 2d sess.]	95	9,000	728.88
105, pt. 1. Retail prices, 1890–1911. Aug. 23, 1912. (Retail prices and cost of living series 1, pt. 1.) [Printed also as H. doc. 921, pt. 1, 62d Cong. 2d sess.]	48	10,000	467.59
105, pt. 2. Retail prices, 1890–1911. Aug. 23, 1912. (Retail prices and cost of living series 1, pt. 2.) [Printed also as H. doc. 921, pt. 2, 62d Cong. 2d sess.]	452	8,500	5,518.08
106, pt. 1. Retail prices, 1890–June, 1912. Aug. 28, 1912. (Retail prices and cost of living series 2, pt. 1.) [Printed also as H. doc. 922, pt. 1, 62d Cong. 2d sess.]	31	10,000	340.76
106, pt. 2. Retail prices, 1890–June, 1912. Aug. 28, 1912. (Retail prices and cost of living series 2, pt. 2.) [Printed also as H. doc. 922, pt. 2, 62d Cong. 2d sess.]	205	8,500	2,130.75
107. Law relating to insurance of salaried employees in Germany; [with introduction and translation by Henry J. Harris]. Sept. 3, 1912. (Workmen's insurance and compensation series 4.) [Printed also as H. doc. 924, 62d Cong. 2d sess.]	67	9,000	458.65

[a] List does not include publications issued by Immigration Bureau and Naturalization Bureau after they became parts of the Department of Labor.

[b] None printed for the Department.

[c] List does not include publications issued by the Bureau after it became a part of the Department of Labor.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

LABOR BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Bulletins—Continued.			
108. Retail prices, 1890–Aug. 1912. Oct. 1, 1912. (Retail prices and cost of living series 3.) [Printed also as H. doc. 925, 62d Cong. 2d sess.]	154	9,000	$1,980.82
109. Statistics of unemployment and work of employment offices; [by Frank B. Sargent]. Oct. 15, 1912. (Miscellaneous series 1.) [Printed also as H. doc. 984, 62d Cong. 3d sess.]	147	7,000	1,154.68
110. Retail prices, 1890–Oct. 1912. Dec. 4, 1912. (Retail prices and cost of living series 4.) [Printed also as H. doc. 1188, 62d Cong. 3d sess.]	151	9,000	1,520.23
111. Labor legislation of 1912. Dec. 13, 1912. 1 tab. (Labor laws of United States series 1.) [Printed also as H. doc. 1189, 62d Cong. 3d sess.]	263	7,500	1,881.42
Series of bulletins published by Bureau. 8vo	1	2,000	5.61
Report on condition of woman and child wage-earners in the United States [printed also as S. doc. 645, 61st Cong. 2d sess.; all 8vo]:			
Vol. 5, Wage-earning women in stores and factories. [Reprint.]	384	500	133.68
Vol. 13, Infant mortality and its relation to employment of mothers	174	1,000	66.76
Vol. 14, Causes of death among woman and child cotton-mill operatives; by Arthur R. Perry	430	1,000	162.99
Vol. 17, Hookworm disease among cotton-mill operatives; by Ch. Wardell Stiles	45	1,000	15.38
Vol. 18, Employment of women and children in selected industries	531	1,000	202.91
Vol. 19, Labor laws and factory conditions	1,125	1,000	396.79
Report on conditions of employment in iron and steel industry in United States [printed also as S. doc. 110, 62d Cong. 1st sess.; all 8vo]:			
Vol. 1, Wages and hours of labor; [by Charles E. Baldwin and Basil M. Manly]. [Reprint.]	602	500	209.28
Vol. 2, Wages and hours of labor, general tables	1,063	(a)	.....
Vol. 3, Working conditions and relations of employers and employees. 7 text fig.	594	1,000	250.16
Vol. 4, Accidents and accident prevention; [by Lucian W. Chaney]. 13 pl. 36 p. of pl. 1 chart, 11 text fig.	350	1,000	219.76
Report on miners' strike in bituminous coal field in Westmoreland County, Pa., 1910–11; [by Walter B. Palmer]. June 22, 1912. [Printed also as H. doc. 847, 62d Cong. 2d sess.] 8vo.	255	500	88.67
Report on strike of textile workers in Lawrence, Mass., in 1912; [by Fred C. Croxton]. [Printed also as S. doc. 870, 62d Cong. 2d sess.] 8vo.	511	1,000	174.58
Increase in prices of anthracite coal following wage agreement of May 20, 1912; [by Basil M. Manly and Hugh S. Hanna]. Mar. 1, 1913. [Printed as H. doc. 1442, 62d Cong. 3d sess.] 8vo.	128	(a)	.....
Compensation to injured Government employees, regulations issued by Secretary governing operation of Government compensation act for employees injured in service of United States, [with] acts of May 30, 1908, Mar. 4, 1911, [and] Mar. 11, 1912. 8vo.	11	5,000	61.71
Publications of Bureau prior to July 1, 1912. 8vo.	13	1,000	67.21

LIGHTHOUSE BUREAU.

Annual report of Commissioner, 1912. 8vo.	108	1,650	$572.96
Same: pt. 2, Purchases in open market or by private contract, fiscal year 1912. [Printed also as H. doc. 1323, 62d Cong. 3d sess.] 8vo.	39	150	322.90
Notice to mariners [issued weekly, jointly with Coast and Geodetic Survey, July 5, 1912–June 27, 1913, nos. 27–52+1–26, 52 numbers.] 8vo.	1,397	182,025	6,249.38
Notice to mariners, Michigan, Detroit River, Livingstone Channel, lights and buoys to be established. Sept. 18, 1912. [From Notice to mariners, no. 37, 1912.] 8vo.	3	500	5.19
Same, Louisiana, Gulf coast, Mississippi River passes, light vessel to be moved, light and whistle buoy to be established. Dec. 5, 1912. [From Notice to mariners, no. 48, 1912.] 8vo.	2	600	4.34
Same, [Pacific coast poster], California, seacoast, San Luis Obispo, light to be changed. July 10, 1912. fo.	1	300	6.81
Same, [Atlantic coast posters nos. 1–10, each 1 p. fo].	10	10,100	71.60
Same, [Pacific coast posters nos. 1–6, each 1 p. fo].	6	2,800	37.93
Lighthouse Service bulletin [issued monthly, July, 1912–June, 1913, nos. 7–18, 12 numbers, 4 p. each]. il. 8vo.	48	16,900	213.07
Atlantic coast, buoy list, Cape Henlopen to Cape Lookout, including Chesapeake Bay and North Carolina Sounds. 5th lighthouse district. Corrected to Apr. 15, 1913. 4to.	95	5,520	1,682.23
Gulf coast, buoy list, Cedar Keys to Rio Grande. 8th lighthouse district. Corrected to Dec. 15, 1912. 4to.	41	3,500	635.11
Great Lakes, buoy list, Lake Erie and Lake Ontario and St. Lawrence River. 10th lighthouse district. Corrected to Aug. 1, 1912. 4to.	47	2,000	539.72
Same, Lake Huron and Lake Superior and connecting waters. 11th lighthouse district. Corrected to Oct. 1, 1912. 4to.	67	1,200	752.39
Same, Lake Michigan and Green Bay. 12th lighthouse district. Corrected to Aug. 1, 1912. 4to.	44	2,500	536.23

(a) None printed for the Department.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

LIGHTHOUSE BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Pacific coast, buoy list, Alaska. 16th lighthouse district. Corrected to June 1, 1913. 4to	24	1,520	$305.44
Light list, Atlantic and Gulf coasts; corrected to July 1, 1912. large 8vo	280	12,000	4,693.67
Same, Great Lakes, United States and Canada; corrected to Oct. 1, 1912. 4to	209	5,000	2,578.67
Same, upper Mississippi River and tributaries. 13th lighthouse district. Corrected to July 15, 1912. narrow 16mo	247	1,250	774.85
Same, Ohio, Tennessee, Kanawha, and Monongahela Rivers. 14th lighthouse district. Corrected to June 1, 1912. narrow 16mo	121	1,200	434.37
Same, lower Mississippi River and tributaries. 15th lighthouse district. Corrected to July 15, 1912. narrow 16mo	89	1,000	336.10
Regulations for lighting bridges, 1912. 5 pl. [Reprint.] 4to	14	500	138.89
Regulations for uniforms, 1912. 19 text fig. 8vo	15	300	58.27
Same [reprint]	15	300	11.63
Civil-service regulations for Lighthouse Service. Jan. 28, 1913. 8vo	24	1,500	73.44
Plans and specifications for buoys and appendages. July 1, 1912. 18 pl. 4to	11	205	65.53
Same. July 1, 1913. 4to	6	50	29.70
Same [reprint]	6	75	30.54
Specifications for erection of Brandywine Shoal Light Station, Delaware Bay, Del. July, 1912. 4to	5	150	21.90
Specifications for metal work of Brandywine Shoal Lighthouse, Delaware Bay, Del. July, 1912. 4to	10	150	53.03
Specifications and contract for 3d-class steel light vessels nos. 96 and 98. 4to.	79	250	340.39
Proposal for supplies, 1914. 3d district. 4to	84	1,500	511.23

NAVIGATION BUREAU.

Annual report of Commissioner, 1912. [Printed also as H. doc. 958, 62d Cong. 3d sess.] 8vo	252	1,000	$2,131.53
44th annual list of merchant vessels of United States, with official numbers and signal letters, and lists of vessels belonging to Government, with distinguishing signals, year ended June 30, 1912. [pts. 1–5.] 4to	431	5,000	5,907.42
Same. [6 pts.] il. [Printed as H. doc. 973, 62d Cong. 3d sess.] 4to	613	(a)	.....
Seagoing vessels of United States, with official numbers and signal letters, 1912; pt. 6 of 44th annual list of merchant vessels of United States, year ending June 30, 1912. il. 4to	132	5,000	1,610.73
Navigation laws of United States, 1911. [Reprint.] 8vo	547	1,000	426.12
Amendments to navigation laws of 1911, 1st supplement. Sept. 25, 1912. 8vo	b 34	2,500	161.50
Same, 2d supplement. Apr. 5, 1913. 8vo	b 12	3,600	95.09
Regulations governing radio communication. Edition, Sept. 28, 1912. 8vo.	13	5,000	77.80
Same [reprint]	13	3,000	26.78
Same [reprint]	13	2,000	19.23
Same. Edition, Feb. 20, 1913. 8vo	14	4,000	66.96
Same. Edition, July 1, 1913. 8vo	15	4,000	67.25
Regulations for radio apparatus and operators on steamers. Edition, July 1, 1913. [Supersedes Department circular 241.] 8vo	11	5,000	72.06
Radio call letters. May 9, 1913. 8vo	4	10,000	27.16
Instructions for radio communication [articles of Berlin International Radiotelegraphic Convention, proclaimed May 25, 1912]. Aug. 28, 1912. 8vo	16	5,000	63.91
Same [reprint]	16	4,000	25.55
Same [reprint]	16	3,000	17.85
London International Radiotelegraphic Convention. May 8, 1913. 8vo	31	10,000	173.89
Documenting, entry, and clearance of pleasure vessels. Aug. 29, 1912. (Bureau circular 8.) [Supersedes Bureau circular 2, June 30, 1906.] 8vo	2	500	7.79
Safety at sea [letter of Secretary dated June 14, 1913]. 4to	4	1,000	19.88

STANDARDS BUREAU.

Annual report of Director, 1912. 8vo	34	500	$82.10
[Report of] 3d annual conference on weights and measures of United States, held at Bureau, Washington, D. C., May 16, 17, 1907. [Reprint.] large 8vo.	110	500	76.32
Weights and measures, [report of] 5th annual conference of representatives from various States, held at Bureau, Washington, D. C., Feb. 25, 26, 1910. [Reprint.] large 8vo	123	500	77.60
Same, [report of] 6th annual conference of representatives from various States, held at Bureau, Washington, D. C., Feb. 17, 18, 1911. 1 text fig. [Reprint, with changes.] large 8vo	158	500	114.85
Same, [report of] 7th annual conference of representatives from various States, held at Bureau, Washington, D. C., Feb. 15, 16, 1912. 5 pl. 19 text fig. large 8vo	186	750	804.33

a None printed for the Department. b Leaves.

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

STANDARDS BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
[Announcement,] 8th annual conference on weights and measures of United States, May 14–17, 1913, at Bureau, Washington, D. C. narrow 8vo	4	1,000	$14.15
Same [reprint]	4	500	3.54
[Program,] 8th annual conference on weights and measures of United States, May 14–17, 1913, [at] Bureau, Washington, D. C. 12mo	8	600	57.43
Supplement to Report to International Committee on Electrical Units and Standards of special technical committee appointed to investigate and report on concrete standards of international electrical units and to recommend value for Weston normal cell. Jan. 1, 1912. large 8vo	34	1,000	192.28
Bulletin, vol. 8, no. 2. June 15, 1912. 5 pl. 33 text fig. large 8vo	214	2,500	345.04
Same, vol. 8, no. 3. Nov. 1, 1912. 23 text fig. large 8vo	175	2,500	248.30
Same, vol. 8, no. 4. Mar. 1, 1913. 14 text fig. large 8vo	141	2,500	272.76
Same, vol. 8, [nos. 1–4, title-page and contents.] large 8vo	3	2,500	11.16
Same, vol. 9, no. 1. Mar. 15, 1913. 1 pl. 44 text fig. large 8vo	159	2,500	305.46
Same, vol. 9, no. 2. Apr. 1, 1913. 10 pl. 12 text fig. large 8vo	184	2,500	643.62
Same, vol. 9, no. 3. Apr. 15, 1913. 1 pl. 11 text fig. large 8vo	157	2,500	1,131.35
Technologic papers [all large 8vo]:			
1. Effect of preliminary heating treatment upon drying of clays; by A. V. Bleininger. Dec. 6, 1910. 1 pl. 12 text fig. [Reprint.]	55	500	42.95
2. Strength of reinforced concrete beams, results of tests of 333 beams, 1st series; by Richard L. Humphrey and Louis H. Losse. June 27, 1911. 3 pl. 8 p. of pl. 3 charts, 34 text fig. 9 tab. [Reprint.]	202	1,000	317.06
3. Tests of absorptive and permeable properties of Portland cement mortars and concretes, with tests of damp-proofing and water-proofing compounds and materials; by Rudolph J. Wig and P. H. Bates. Aug. 22, 1911. 6 pl. 64 text fig. [Reprint.]	127	1,000	144.95
4. Effect of added fatty and other oils upon carbonization of mineral lubricating oils; by C. E. Waters. Aug. 24, 1911. [Reprint.]	14	500	12.20
5. Effect of high-pressure steam on crushing strength of Portland cement mortar and concrete; by Rudolph J. Wig. Sept. 5, 1911. 2 pl. 6 text fig. [Reprint.]	25	1,000	41.79
10. Melting points of fire bricks; by C. W. Kanolt. June 15, 1912. 1 pl. 3 text fig.	17	1,000	98.06
11. Comparison of 5 methods used to measure hardness; by Ralph P. Devries. July 22, 1912. 1 pl. 11 text fig.	27	750	182.76
12. Action of salts in alkali water and sea water on cements [with bibliography]; by P. H. Bates, A. J. Phillips, and Rudolph J. Wig. Nov. 1, 1912. 8 pl. 45 text fig.	157	2,500	1,438.07
13. Evaporation test for mineral lubricating and transformer oils; by C. E. Waters. Jan. 1, 1913.	13	1,000	75.84
14. Legal specifications for illuminating gas; by E. B. Rosa and R. S. McBride. Jan. 10, 1913.	31	1,000	120.56
24. Determination of phosphorus in steels containing vanadium; by J. R. Cain and F. H. Tucker. May 17, 1913.	11	500	42.49
Reprints from Bulletins [all large 8vo]:			
13. Testing of clinical thermometers; by C. W. Waidner and L. A. Fischer. Nov. 1, 1905. 10 pl. [Reprint.]	17	300	33.47
14. Measurement of inductance by Anderson's method, using alternating currents and vibration galvanometer; by E. B. Rosa and F. W. Grover. 17 text fig. [Reprint.]	48	250	26.72
23. Positive charges carried by the canal rays; by L. W. Austin. 1 text fig. [Reprint.]	3	300	2.79
24. Radiation from platinum at high temperatures; by G. K. Burgess. [Reprint.]	5	300	4.25
Same [reprint]	5	500	4.59
33. New potentiometer for measurement of electromotive force and current; by H. B. Brooks. 1 pl. 4 text fig. [Reprint.]	16	250	13.96
41. Revision of formulæ of Weinstein and Stefan for mutual inductance of coaxial coils; by Edward B. Rosa. 7 text fig. [Reprint.]	29	250	17.92
54. On sulphocyanic acid; by H. N. Stokes and J. R. Cain. Jan. 20, 1907. [Reprint.]	7	250	6.85
Same [reprint]	7	250	6.80
56. Mutual inductance of circle and coaxial single layer coil, the Lorenz apparatus and the Ayrton-Jones absolute electrodynamometer; by Edward B. Rosa. Mar. 1, 1907. 12 text fig. [Reprint.]	30	500	26.08
62. Melting points of iron group elements by new radiation method; by G. K. Burgess. Apr. 4, 1907. 1 text fig. [Reprint.]	13	250	9.83
65. New determination of ratio of electromagnetic to electrostatic unit of electricity; by Edward B. Rosa and N. E. Dorsey. May 20, 1907. 6 pl. 2 charts, 39 text fig. [Reprint.]	174	300	119.28
Same [reprint]	174	250	108.96
68. Calorimetric resistance thermometers and transition temperature of sodium sulphate; by H. C. Dickinson and E. F. Mueller. May 23, 1907. 1 pl. 3 text fig. [Reprint.]	23	250	19.20
73. Variation of resistances with atmospheric humidity; by Edward B. Rosa and Harold D. Babcock. Oct. 4, 1907. 7 text fig. [Reprint.]	22	500	20.64
77. Atomic weight of hydrogen; by W. A. Noyes. Sept. 11, 1907. 3 text fig. [Reprint.]	28	300	18.54
78. Best method of demagnetizing iron in magnetic testing; by C. W. Burrows. Sept. 3, 1907. 27 text fig. [Reprint.]	73	300	58.78

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

STANDARDS BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Reprints from Bulletins—Continued.			
85. Instruments and methods used in radiometry; by W. W. Coblentz. Sept. 1, 1907. 18 text fig. [Reprint.]	72	500	$56.09
88. Effect of wave form upon iron losses in transformers; by Morton G. Lloyd. Oct. 31, 1907. 7 text fig. [Reprint.]	36	300	27.33
95. Method for producing feebly damped high frequency electrical oscillations for laboratory measurements; by L. W. Austin. Apr. 27, 1908. 3 text fig. [Reprint.]	6	250	4.57
96. On the advantages of high spark frequency in radiotelegraphy; by L. W. Austin. Apr. 27, 1908. 2 text fig. [Reprint.]	7	500	5.09
99. On methods of obtaining cooling curves; by George K. Burgess. Aug. 3, 1908. 1 chart, 9 text fig. [Reprint.]	29	500	28.29
107. New form of standard resistance; by Edward B. Rosa. Oct. 1, 1908. 8 pl. 1 chart, 7 text fig. [Reprint.]	24	300	40.97
Same [reprint]	24	250	36.56
117. Determination of magnetic inductance in straight bars; by Charles W. Burrows. May 1, 1909. 29 text fig. [Reprint.]	60	300	38.71
120. Note on thermoelectric properties of tantalum and tungsten; by W. W. Coblentz. Feb. 27, 1909. 2 text fig. [Reprint.]	4	300	3.04
124. Platinum resistance thermometry at high temperatures [with bibliography]; by C. W. Waidner and G. K. Burgess. June 26, 1909. 2 pl. 2 charts, 4 text fig. [Reprint.]	84	500	66.71
132. Luminous efficiency of the firefly; by Herbert E. Ives and William W. Coblentz. Aug. 1, 1909. 1 pl. 4 text fig. [Reprint.]	18	300	18.35
138. Mutual inductance of two parallel coaxial circles in terms of hypergeometrical series; by Frederick W. Grover. Feb. 1, 1910. 2 text fig. [Reprint.]	16	250	10.33
143. Note on temperature scale between 100° and 500° C. [with list of references]; by C. W. Waidner and G. K. Burgess. May 27, 1910. [Reprint.]	11	300	11.46
145. Device for measuring torque of electrical instruments; by P. G. Agnew. June 27, 1910. 2 text fig. [Reprint.]	4	250	2.88
147. Temperature coefficient of resistance of copper; by J. H. Dellinger. July 12, 1910. [Reprint.]	33	300	20.44
148. Electrical conductivity of commercial copper; by F. A. Wolff and J. H. Dellinger. Aug. 1, 1910. 1 pl. 2 text fig. 1 tab. [Reprint.]	26	300	24.45
149. On constancy of sulphur boiling point; by C. W. Waidner and G. K. Burgess. Dec. 6, 1910. [Reprint.]	4	500	2.84
159. Some quantitative experiments in long distance radiotelegraphy; by L. W. Austin. Feb. 1, 1911. 28 text fig. [Reprint.]	51	500	40.74
163. Comparison of American direct-current switchboard voltmeters and ammeters; by T. T. Fitch and C. J. Huber. Mar. 1, 1911. 3 pl. 2 text fig. [Reprint.]	18	300	22.97
164. Study of current transformer with particular reference to iron loss [with bibliography]; by P. G. Agnew. June 1, 1911. 1 chart, 28 text fig. [Reprint.]	54	500	43.70
[169.] Formulas and tables for calculation of mutual and self-inductance, revised; by E. B. Rosa and F. W. Grover. Jan. 1, 1911. 57 text fig. [Reprint, with corrections.]	239	500	179.03
171. Determination of international ampere in absolute measure; by E. B. Rosa, N. E. Dorsey, and J. M. Miller. Sept. 9, 1911. 3 pl. 21 text fig. [Reprint.]	127	500	92.45
174. Determination of total sulphur in india rubber; by C. E. Waters and J. B. Tuttle. July 19, 1911. [Reprint.]	11	250	8.96
177. Resistance coils for alternating current work; by H. L. Curtis and F. W. Grover. Sept. 1, 1911. 3 text fig. [Reprint.]	25	500	22.20
181. Four-terminal conductor and Thomson bridge; by Frank Wenner. Mar. 8, 1912. 12 text fig.	54	500	252.47
182. Standardization of potassium permanganate solution by sodium oxalate; by R. S. McBride. June 1, 1912. 1 text fig.	34	500	146.55
183. Benzoic acid as acidimetric standard; by George W. Morey. May 14, 1912.	8	500	36.82
184. Tubular electrodynamometer for heavy currents; by P. G. Agnew. July 17, 1912. 2 text fig.	8	500	30.51
185. Thermometric lag; by D. R. Harper, 3d. Mar. 5, 1912. 11 text fig.	58	500	399.72
Same [reprint]	58	500	42.98
186. Determination of manganese as sulphate and by sodium bismuthate method; by William Blum. June 21, 1912.	28	500	113.08
187. New precision colorimeter; by P. G. Nutting. July 25, 1912. 1 pl. 1 text fig.	5	500	47.68
Same [reprint, with changes]	5	500	9.71
188. Instruments and methods used in radiometry, 2; by W. W. Coblentz. Dec. 8, 1911. 17 text fig.	59	500	268.48
189. Antenna resistance; by L. W. Austin. Mar. 1, 1912. 7 text fig.	10	500	62.94
190. Energy losses in some condensers used in high-frequency circuits; by L. W. Austin. Mar. 1, 1912. 3 text fig.	10	500	55.91
191. Selective radiation from various substances, 4; by W. W. Coblentz. June 5, 1912. 12 text fig.	39	500	209.63
192. On modified form of stability test for smokeless powder and similar materials [with list of references]; by H. C. P. Weber. June 22, 1912. 2 text fig.	13	750	72.69

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

STANDARDS BUREAU—Continued.

Title and description.	Pages.	Edition.	Cost.
Reprints from Bulletins—Continued.			
193. Atomic weight of bromine; by H. C. P. Weber. Oct. 1, 1912. 2 text fig.	22	500	$83.92
194. Silver voltameter, pt. 1, 1st series of quantitative experiments; by E. B. Rosa and G. W. Vinal. Aug. 1, 1912. 5 pl. 6 text fig.	59	500	326.50
195. Silver voltameter, pt. 2, Chemistry of filter paper voltameter and explanation of striations; by E. B. Rosa, G. W. Vinal, and A. S. McDaniel. Oct. 1, 1912. 5 pl. 3 text fig.	76	500	314.85
198. Micropyrometer; by George K. Burgess. Dec. 9, 1912. 1 pl. 1 text fig.	6	500	39.64
199. Simplified formula for change in order of interference due to changes in temperature and pressure of air; by Irwin G. Priest. Oct. 1912.	5	500	25.42
Bureau circulars [all large 8vo]:			
2. Measurements of length and area, including thermal expansion. 4th edition, revised and enlarged. May 1, 1912. [Supersedes 3d edition of Circular 2 on Metal tapes.] [Reprint.]	21	500	17.22
8. Testing of thermometers. 2d edition, revised and enlarged. June 30, 1911. [Reprint.]	52	1,000	49.11
9. Testing of glass volumetric apparatus. 5th edition. June 1, 1911. 5 text fig. [Reprint.]	14	250	10.76
Same. 6th edition. May 1, 1913. 7 text fig.	21	500	97.92
14. Analyzed irons and steels, methods of analysis. 3d edition. June 29, 1912.	12	1,000	42.36
16. Testing of hydrometers. 2d edition. May 15, 1911. 3 text fig. [Reprint.]	14	250	10.65
17. Magnetic testing. 2d edition. Dec. 1, 1910. [Reprint.]	13	300	10.61
19. Standard density and volumetric tables. 3d edition. Apr. 1, 1913.	44	500	252.76
20. Testing of electrical measuring instruments. Oct. 1, 1909. [Reprint.]	31	300	17.11
22. Standard specifications for transformers, oil-immersed, self-cooled, 60-cycle, 2200 volts. 2d edition. May 15, 1911. [Reprint.]	12	500	12.79
24. Publications of Bureau. 3d edition. July 1, 1912.	44	1,500	172.01
Same [reprint]	44	2,500	83.64
Same [reprint]	44	1,000	43.74
25. Standard analyzed samples, general information. 4th edition. Nov. 1, 1912.	15	1,000	87.99
33. United States Government specification for Portland cement. May 1, 1912. 10 text fig. [Reprint.]	28	2,500	66.41
34. Relation of horsepower to kilowatt. 1st edition. June 1, 1912.	12	1,000	57.14
35. Melting points of chemical elements. June 15, 1912.	2	500	14.19
Same [reprint]	2	1,000	2.69
36. Testing and properties of electric condensers [with list of Bureau publications concerning electric condensers]. 1st edition. June 30, 1912. 1 chart, 2 text fig.	26	1,000	148.36
37. Electric wire and cable terminology. 1st edition. Jan. 15, 1913. 15 text fig.	13	1,000	76.17
38. Testing of mechanical rubber goods. 1st edition. Aug. 1, 1912. 20 text fig.	38	1,000	254.90
Same. 2d edition. Apr. 5, 1913.	30	300	50.82
39. Specifications for and measurement of standard sieves. 1st edition. Dec. 16, 1912.	14	1,000	57.06
40. Sodium oxalate as standard in volumetric analysis. 1st edition. Oct. 1, 1912.	11	500	36.80
Same. 2d edition. May 15, 1913.	13	1,000	46.69
41. Testing and properties of textile materials. 1st edition. Apr. 15, 1913.	16	1,500	74.88
Tables of equivalents of United States customary and metric weights and measures. 4th edition. Jan. 31, 1913. 4to.	46	500	93.65
National Bureau of Standards. Sept. 10, 1912. 13 text fig. narrow 8vo.	19	1,000	83.83
National Bureau of Standards. [Reprint.] 8vo.	24	3,000	39.58
Suggestions for determination of carbon in Bureau analyzed steels by direct combustion. large 8vo.	2	500	4.87

STEAMBOAT-INSPECTION SERVICE.

Annual report of Supervising Inspector General, 1912. 8vo.	78	1,000	$595.48
List of officers of merchant steam, motor, and sail vessels licensed during 6 months ended June 30, 1912. 8vo.	200	1,000	1,610.15
Laws governing Service, Revised statutes as modified by acts of Congress. Edition, June 5, 1912. 8vo.	63	3,000	31.31
Same [reprint with omission]	62	5,000	108.05
Same [reprint]	62	8,000	160.25
Same. Edition, Apr. 15, 1913. 8vo.	63	21,000	589.30
General rules and regulations, prescribed by Board of Supervising Inspectors, amended Jan. 1912, further amended Apr. 26, May 21, Sept. 6 and 25, 1912. Edition, Sept. 27, 1912. 7 text fig. 8vo.	141	3,500	334.02

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PUBLICATIONS EMANATING FROM THE DEPARTMENT OF COMMERCE, FISCAL YEAR ENDED JUNE 30, 1913, BY BUREAUS—Continued.

STEAMBOAT-INSPECTION SERVICE—Continued.

Title and description.	Pages.	Edition.	Cost.
General rules and regulations, etc. [reprint]	141	2,000	$110.41
Same, amended Jan. 1913, further amended Apr. 18, 1913. Edition, Apr. 26, 1913. 7 text fig. 8vo	145	25,000	1,449.92
Amendments of steamboat-inspection rules and regulations. June 29, 1912. 8vo	7	16,000	91.10
Same. Sept. 27, 1912. 8vo	4	17,000	49.67
Pilot rules for certain inland waters of Atlantic and Pacific coasts and coast of Gulf of Mexico. Edition, May 1, 1912. 5 text fig. 8vo	30	10,000	131.57
Same [reprint]	30	10,000	128.87
Same. Edition, July 1, 1913. 5 text fig. 8vo	29	75,000	901.35
Pilot rules for rivers whose waters flow into Gulf of Mexico and their tributaries and Red River of the North. Edition, Aug. 1, 1911. 5 text fig. [Reprint.] 8vo	22	3,000	35.76
Same [reprint]	22	1,500	21.09
Pilot rules for Great Lakes and their connecting and tributary waters [as far east as Montreal]. Edition, May 1, 1912. 5 text fig. [Reprint.] 8vo.	20	4,000	42.89
Same [reprint]	20	2,000	24.70
Same [reprint]	20	3,000	47.32

It will be seen from the foregoing list that the publications of the Department have a wide range and include subjects within the fields of science, industry, shipping, trade, business management, finance, and statistics, but all clearly classifiable under the general head of commerce. There is represented in the table a total of 901 publications, against 887 in the fiscal year 1912. Twenty-six of these, against 31 in 1912, were printed in two or more editions during the year, while 76, compared with 51 last year, were reprints, without change, of issues of earlier years. The publications listed contained a total of 50,560 printed pages, compared with 54,702 in 1912, and there were issued of them for the Department a grand total of 7,522,155 copies, against 7,144,490 in the preceding year, an increase of 377,665 copies.

The following recapitulation of the foregoing table, together with summary figures for 1912, is submitted for comparative purposes:

Bureau.	Publications.		Pages.		Copies printed for Department.		Cost, 1913.
	1912	1913	1912	1913	1912	1913	
Office of the Secretary	36	50	1,706	2,560	213,350	92,850	$8,040.47
Census Bureau [a]	.....	30	.....	2,247	.....	191,700	48,766.20
Children's Bureau [b]	.....	2	.....	87	.....	10,500	198.93
Coast and Geodetic Survey	35	25	4,958	2,070	67,650	31,500	16,561.04
Corporations Bureau	16	19	3,019	3,954	28,700	33,225	14,553.78
Fisheries Bureau	44	49	3,530	2,516	31,775	44,225	12,494.91
Foreign and Domestic Commerce Bureau [c]	440	428	15,387	16,343	5,789,565	6,264,435	135,270.79
Immigration and Naturalization Bureau	50	27	1,341	839	139,575	92,725	5,169.70
Labor Bureau	38	29	12,375	8,127	153,600	132,000	20,351.75
Lighthouse Bureau	105	105	3,023	3,147	238,375	256,695	22,087.51
Navigation Bureau	9	16	3,051	2,239	15,600	74,600	10,998.50
Standards Bureau	95	108	4,765	5,272	88,150	86,700	12,857.91
Steamboat-Inspection Service	19	13	1,547	1,159	378,150	211,000	6,511.71
Total	887	901	54,702	50,560	7,144,490	7,522,155	313,863.20

[a] Publications of the Census Bureau paid for in 1912 from appropriations for the Thirteenth Decennial Census.

[b] Children's Bureau issued no publications in 1912, not being in existence during that year.

[c] Figures for 1912 are those of the Bureau of Manufactures and Bureau of Statistics jointly, these two bureaus having been consolidated into the Bureau of Foreign and Domestic Commerce by the act of Aug. 23, 1912.

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DISTRIBUTION OF PUBLICATIONS.

The work of addressing, wrapping, mailing, or otherwise dispatching publications for public distribution was transferred from the executive departments to the Government Printing Office (Superintendent of Documents) by section 8 of the act approved August 23, 1912, making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year 1913. The act required also that all machines, equipment, and materials used in such work be turned over to the Public Printer before October 1, 1912. The Division complied with this requirement during the month of September, 1912, and a statement of the number of publications and a list of the machines, equipment, and materials transferred to the Superintendent of Documents were included in the annual report for last year. Also six employments, with salaries aggregating $3,820, were terminated in the Division, in accordance with the provision of law referred to.

This change in the method of dispatching publications has not relieved the Division of any of its duties except those in connection with addressing wrappers from such mailing lists as are supplied with stencils and the labor of wrapping the publications. The maintenance of mailing lists and the writing of franks for use in responding to individual requests for publications still devolve on the Division, and the correspondence and record keeping have increased rather than decreased.

Taking all things into consideration, it can not be said that the present system has proven entirely satisfactory. Experience has not demonstrated that the system is economical, nor can it be claimed that prompt and efficient attention to individual requests for particular publications is possible under conditions which now prevail, because of the time necessarily consumed in transmitting franks from the Division to the Office of the Superintendent of Documents and the extra handling required. Frequent though unavoidable congestion in the Office of the Superintendent of Documents must necessarily add to the resulting delay. Much extra correspondence and searching of records and files is caused by addressees making complaints of failure to receive publications requested, due in many cases to this delay. As these complaints are often transmitted through the bureaus, it may readily be seen that much extra work is caused to both the bureaus and the Division by the present roundabout method of distribution.

When publications were sent direct from the Division, requests were acted on and publications placed in the mails as a rule not later than the day following the receipt by the Department of the requests. This is now rarely possible. Also by reason of the familiarity of the employees of the Division with the Department's publications there was much less liability of error in sending the publications out. As a result, the present system is often the cause of embarrassment to the Department, especially in filling telephonic requests from Members of Congress, representatives from foreign governments, and officials of the departments who desire copies of publications for immediate use. Under a strict construction of the law such requests can be filled only through the Government Printing Office, which is attended with

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more or less delay, while under the former system they could be complied with in a few minutes.

The Division is convinced that it would be wise to modify the law so far as it applies to the filling of individual requests for publications, but it is not prepared to suggest any change in the present system whereby publications sent out on regular mailing lists having stencils for use in addressing machines are mailed by the Superintendent of Documents. The printing bills (S. 825 and H. R. 6539) now pending in Congress, with the indorsement of the Joint Committee on Printing, contain provisions which, if enacted into law, will accomplish the reform desired.

The number of publications of the Department sent out on mailing lists and in response to miscellaneous requests during the fiscal year 1913 was 7,107,199, against 6,484,506 during the preceding year, an increase of 622,693, or 9.6 per cent. The following is a statement of the distribution by months:

Month.	Distributed.	Month.	Distributed.
July	574,027	February	535,435
August	623,000	March	568,999
September	584,625	April	590,911
October	627,359	May	577,376
November	552,972	June	681,087
December	584,835		
January	606,573	Total	7,107,199

The above statement does not include large quantities of publications printed for official use by the Department, which accounts for the number so distributed being less than the number actually issued by the Department, as shown by the table on preceding pages of this report.

CONDENSED HISTORY AND LAW OF THE DEPARTMENT.

In 1904 there was issued under the supervision of the Secretary a volume entitled "Organization and Law of the Department of Commerce and Labor." Since then there have been so many changes, both in the Department and in the laws governing it, that the publication has, to a large extent, become obsolete. The Division of Publications therefore undertook during the past year a revision of the work, which has been issued under the title "Department of Commerce: Condensed history, duties, and practical operation of the Department and its several bureaus and offices, together with laws relating specifically thereto."

This publication does not purport to contain laws which affect all executive departments alike, but only those which place duties or responsibilities on the Department of Commerce, or some one of its various units, or in some manner relate specially thereto. There was included in the revised volume a short description of the ordinary functions and practical operations of each of the several bureaus and offices of the Department, but the extensive legislative history, which forms a large part of the previous volume and is of value from a historical standpoint only, was omitted.

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The purpose of this work is to afford to officials of the Government and others interested concise information relative to the laws governing and conduct of the Department.

Another publication of the Division, "List of Publications of the Department of Commerce Available for Distribution," was revised twice during the year.

DEPARTMENT OF LABOR.

During May and June the Division was engaged largely on work in connection with the separation and transfer to the Department of Labor of the records, accounts, and materials which passed to the jurisdiction of that Department under the provisions of the act of March 4, 1913, creating the Department, and the act of May 1, 1913, making appropriations for certain expenses incident to the first session of the Sixty-third Congress, and for other purposes. Although the new Department began its existence immediately upon Executive approval of the act creating it, the lack of organization required that this Division continue for a time to exercise supervision over its printing, to supply blank books, blank forms, and printed stationery to its bureaus and outside services, and to maintain its mailing lists and distribute its publications. Early in May the Secretary of Labor detailed a clerk to act as chief of the Division of Publications and Supplies of the new Department, and this official and his assistants were furnished accommodations in this office. While this division of working space was necessarily attended with some confusion, it was realized that it was the best arrangement possible under the circumstances, and the transfer of work relating to the bureaus, offices, and services which now constitute the Department of Labor proceeded in a most agreeable and amicable manner.

Section 5 of the act of March 4, 1913, creating the Department of Labor, provided as follows:

> That the official records and papers now on file in and pertaining exclusively to the business of any bureau, office, department, or branch of the public service in this Act transferred to the Department of Labor, together with the furniture now in use in such bureau, office, department, or branch of the public service, shall be, and hereby are, transferred to the Department of Labor.

The act approved May 1, 1913, making appropriations for certain expenses incident to the first session of the Sixty-third Congress, and for other purposes, contained the following provisions:

> All appropriations made for the fiscal year nineteen hundred and fourteen and balances, after March fourth, nineteen hundred and thirteen, of appropriations made for the fiscal year nineteen hundred and thirteen, together with all appropriations made or to be made in the sundry civil appropriation Act for the fiscal year nineteen hundred and fourteen, for the bureaus, offices, or other divisions of whatever designation or character, transferred from the Department of Commerce and Labor to the Department of Labor, under the Act approved March fourth, nineteen hundred and thirteen, shall be available for expenditure in and by the Department of Labor, and shall be treated the same as though said branches of the public service had been directly named in the laws making said appropriations as parts of the Department of Labor, under the direction of the Secretary of the department: *Provided*, That as to all general appropriations for printing and binding, and contingent or miscellaneous expenses, the amounts that shall be transferred hereunder, except where the same are specifically fixed by law, shall in the case of each bureau, office, or other division be not less than the average amount expended on account of or allotted for expenditure to each of the same during the fiscal years nineteen hundred and twelve and nineteen hundred and thirteen.

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The Secretary of Commerce is authorized and directed, as soon as may be practicable, to transfer to the Department of Labor all chiefs of division, assistant chiefs of division, clerks, messengers, assistant messengers, watchmen, charwomen, laborers, or others now employed in the divisions of his office who were, up to March fourth, nineteen hundred and thirteen, wholly engaged upon the work relating to the business of the bureaus and offices of the Department of Commerce and Labor transferred to the Department of Labor under the Act of March fourth, nineteen hundred and thirteen; and in proportion to the number of persons in the divisions of his office whose time and labor were partially devoted to the work of said bureaus and offices he shall transfer approximately an equivalent number of clerks and other employees to said Department of Labor, and the appropriations made for the compensation of all persons transferred hereunder shall be credited to and disbursed by the Department of Labor.

It was in accordance with these provisions that transfers were made of suballotments for printing and binding; stocks of publications, blank books, and blank forms; furniture, files, etc., and employees as shown on succeeding pages.

TRANSFERS OF SUBALLOTMENTS FOR PRINTING AND BINDING.

Fiscal year 1913.—The sundry civil act of August 24, 1912, allotted $400,000 to the Department of Commerce and Labor for printing and binding for 1913. This sum was suballotted to the various bureaus, offices, and services of the Department on August 30, 1912, in proportion to their expenditures in previous years and as nearly as possible in accordance with the estimates submitted by them for 1913. The status of the suballotments to the bureaus, offices, and services transferred to the Department of Labor by the act of March 4, 1913, was on May 5, 1913, as follows:

Bureau, office, or service.	Suballotment.	Bills rendered to May 5.	Balance.
Bureau of Labor Statistics	$35,000.00	$19,265.44	$15,734.56
Bureau of Immigration	5,500.00	3,989.66	1,510.34
Division of Information	2,550.00	336.32	2,213.68
Immigration Service	14,500.00	9,774.71	4,725.29
Bureau of Naturalization	2,200.00	1,612.98	587.02
Naturalization Service and Naturalization Examiners Service	14,000.00	6,323.56	7,676.44
Children's Bureau	3,000.00	399.93	2,600.07
Total	76,750.00	41,702.60	35,047.40

Up to May 5, 1913, as shown by the foregoing table, the Department had expended from the suballotments enumerated $41,702.60, leaving a balance of $35,047.40, which was, however, liable for work ordered but not completed, and consequently unbilled, at that time. On May 9, 1913, the Public Printer was authorized to transfer this balance to the Department of Labor, with the understanding that all work ordered by the Department of Commerce and Labor and the Department of Commerce prior to May 5, 1913, for the bureaus, offices, and services transferred to the Department of Labor, and remaining on that date at the Government Printing Office uncompleted and unbilled, as well as all work ordered during the balance of the fiscal year by the Department of Labor, was to be charged against it.

The Department of Labor expended up to June 30, 1913 (including amounts which had previously been expended for its bureaus, offices,

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and services by this Department up to May 5, 1913), $72,375.24. Of this sum, $3,212.20 (which included $564.41 for reimbursing the allotment to the Treasury Department for printing and binding for the General Supply Committee) was expended by the Department of Labor for printing and binding for the Office of the Secretary of Labor. Of the $35,047.40 transferred to the Department of Labor on May 9, 1913, there was an unexpended balance on June 30, 1913, of $4,374.76, whereas of the $323,250 which the Department of Commerce reserved for itself the unexpended balance on June 30, 1913, was only $3.14. Further, the Department of Commerce had at the Government Printing Office on July 1, 1913, uncompleted and unbilled work which it is estimated will cost $32,660.20. This is $4,624.33 in excess of the estimated cost of uncompleted and unbilled work at that office at the beginning of the preceding fiscal year (the figures of the preceding year including work for the bureaus, offices, and services since transferred to the Department of Labor).

Fiscal year 1914.—The estimates of the bureaus, offices, and services of the Department of Commerce and Labor for printing and binding for the fiscal year 1914 totaled $608,216. These estimates were revised by the Department, and in many cases they were reduced. It so happens, however, that the proportionate reductions in the estimates of the bureaus transferred to the Department of Labor were somewhat less than in those of the bureaus which remain in the Department of Commerce. The total of the estimates of the bureaus, offices, and services, which, as stated, amounted to $608,216, was reduced by the Department to $565,000, and the allotment made by the sundry civil act of June 23, 1913, was but $525,000. The Department, as a basis for its estimate for printing and binding for 1914, had fixed upon the suballotments which it proposed to make to the various bureaus, offices, and services, and these proposed suballotments were not disturbed except to reduce them all in the same proportion that Congress in its appropriation reduced the total estimate of the Department. Under this plan the suballotments to the several offices, bureaus, and services transferred to the Department of Labor were as follows:

Bureau of Labor Statistics	$32,500
Bureau of Immigration	5,100
Division of Information	2,300
Immigration Service	18,600
Bureau of Naturalization	1,400
Naturalization Service and Naturalization Examiners Service	13,925
Children's Bureau	9,300
Total	83,125

On June 30, 1913, the Department authorized the Public Printer to transfer to the Department of Labor $84,000, which covers all of the foregoing suballotments, together with $875 which the Department felt would cover expenditures which would ordinarily be made from the suballotment to the Office of the Secretary for printed supplies furnished the bureaus, offices, and services transferred to the Department of Labor. The printed supplies so furnished in 1913 cost only $281.13.

It should be stated here that the original estimates of the Department for printing and binding for the offices transferred to the

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Department of Labor were more liberal than those for the offices which remain in the Department of Commerce. For instance, the Children's Bureau had been but recently organized when the estimates for printing and binding for 1914 were sent to Congress, and it was not possible at that time to estimate its needs accurately. An item of $10,000, however, was fixed upon, and was included for that Bureau. In making the suballotments this was reduced (in proportion to the reduction made by Congress in the Department estimate) to $9,300. The expenditures for this Bureau in 1913 were but $798.31, which would indicate that for 1914 a considerable proportion of its suballotment will not be needed by the Bureau.

It is worthy of note that the total allotments to the bureaus, offices, and services of the Department of Labor for 1913 amounted to $76,750, whereas for 1914 these suballotments total $84,000, an increase of $7,250. This is an increase of more than 9 per cent, whereas (leaving out the Bureau of the Census, which in 1914 for the first time is to use a considerable part of the allotment to the Department) the increase in the amount available for the Department of Commerce is less than 4 per cent.

The bureaus, offices, and services transferred to the Department of Labor expended in 1912 for printing and binding $74,327.89, which is $9,672.11 less than is available for that Department in 1914 from the allotment to this Department.

TRANSFER OF PUBLICATIONS.

On May 15, 1913, the Secretary by letter authorized the Public Printer to amend his records so as to show that the stocks of the publications in the hands of the Superintendent of Documents belonging to the bureaus that were transferred to the Department of Labor by the act of March 4, 1913, had become the property of that Department, and directed that thereafter requests for them were to be honored only on the order of the Secretary of Labor or his authorized representative.

There were thus transferred to the Department of Labor stocks on hand of 165 different publications, aggregating 107,710 copies, as follows:

Bureau.	Publications.	Copies.
Bureau of Labor Statistics	132	61,022
Bureau of Immigration	17	8,732
Division of Information	12	36,155
Bureau of Naturalization	4	1,800
Children's Bureau	0	0
Total	165	107,710

TRANSFER OF BLANK BOOKS AND BLANK FORMS.

The Acting Chief of the Division of Publications and Supplies, Department of Labor, assumed his duties on May 6, 1913, and immediately took charge of the blank books and blank forms in stock in the Division of Publications of this Department belonging to the

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Immigration Service, Naturalization Service (clerks of courts), and Naturalization Examiners Service. The stock on hand at that time embraced 215 different kinds of books and blanks, aggregating 1,156,372 copies.

TRANSFER OF OFFICE EQUIPMENT.

By authority of the Secretary, given under dates of May 20 and July 30, 1913, there have been transferred from the Division of Publications to the Department of Labor furniture and other office equipment consisting of 107 different articles, valued at $693.07.

TRANSFER OF FILES AND OFFICIAL PAPERS.

On June 17, 1913, the Secretary authorized the transfer to the Department of Labor of all complete files and mailing lists of the Division relating to the work of that Department and the bureaus, offices, and services thereof. The transfer was accomplished on June 30 without any hindrance whatever to the work of the two Departments.

The Division has also obtained authority to transfer at a later date certain material in its correspondence files relating to matters now under the jurisdiction of the Department of Labor, such as correspondence with the Public Printer concerning illustrations for publications issued by the bureaus now under that Department, requests from Members of Congress and others for such publications and answers thereto, and correspondence concerning contracts for special papers for the Naturalization Service. This material will be transferred from time to time as it is possible to eliminate it from the permanent files of the Division.

TRANSFER OF EMPLOYEES.

The creation of the Department of Labor and the transfer thereto of certain bureaus and services of this Department affected materially only two sections of the Division of Publications—one having to do with the filling of requisitions from outside services for blank books and blank forms and the other in charge of the Department's mailing lists and the distribution of its publications. In the section first named there were formerly three employees—1 clerk at $1,400, 1 clerk at $1,000, and 1 packer (assistant messenger) at $720 per annum. These employees did all the work in connection with the filling of requisitions from eight outside services—Lighthouse, Steamboat-Inspection, Customs, Radio, Shipping, Immigration, Naturalization (clerks of courts), and Naturalization Examiners Services—three of which (Immigration, Naturalization, and Naturalization Examiners Services) were transferred to the new Department. The three services transferred to the Department of Labor were responsible for only about one-half of the work of this section, but the Division consented to the transfer of the clerk at $1,400 per annum and the assistant messenger (total salaries $2,120 per annum), while it reserved for itself only the clerk at $1,000 per annum.

In the section having charge of the mailing lists and the distribution of publications there were employed 1 clerk at $1,200, 2 clerks at $1,000 each, 1 clerk at $900, and 1 assistant messenger at $720.

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Only one bureau (the Bureau of Labor, now Bureau of Labor Statistics) transferred to the Department of Labor has ever issued any considerable number of publications, whereas at least seven bureaus remaining in the Department of Commerce issue publications in large quantities. It was therefore deemed equitable to transfer to the new Department one clerk at $900 per annum, who could easily dispose of the work transferred, and this was done.

While the other work of the Division was only slightly affected, if at all, by the separation of the two Departments, the Division consented to the transfer also of 2 laborers at $660 each. The following statement shows the grades, number, and annual salaries of all employees thus transferred from the Division of Publications to the new Department:

Grade.	Number.	Salaries.
Clerk	1	$1,400
Do	1	900
Assistant messenger	1	720
Laborers (at $660)	2	1,320
Total	5	4,340

REVISION OF PRINTING LAWS.

The laxity and incompleteness of the laws relating to the public printing and binding have been recognized for a number of years, and as far back as March 3, 1905, Congress created a Printing Investigation Commission and directed it to examine into the subject and recommend such legislation as might in its opinion improve the unsatisfactory conditions which were known to exist. The work of this commission extended through several sessions of Congress and was thorough. It discovered many faults in the application of the present laws and remedied them where it had power to do so, and in a few cases glaring defects needing prompt attention were cured by legislation. It eventually, however, presented to Congress a complete revision of the printing laws, which was introduced during the second session of the Sixty-second Congress as Senate bill 4239. This bill was reported to the Senate in January, 1912, and passed that body on April 9 following. It was fully considered by the Committee on Printing of the House of Representatives and, with sundry amendments, was favorably reported to the House on June 1, but no further action was taken by that Congress.

A similar bill, embodying the amendments made during debate in the Senate and the recommendations of the House Committee on Printing, has been introduced in the Sixty-third Congress. It was presented in the Senate (S. 825) by Mr. Smoot and in the House (H. R. 6539) by Mr. Barnhart, and is now before the Printing Committees of the respective Houses.

It is confidently hoped and expected that this bill will become a law during the approaching regular session of Congress.

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SALE OF PULICATIONS.

Inquiries from time to time, especially by the Printing Investigation Commission, have brought to light extravagances in public printing and binding, not the least important of which is the waste in the present method of free distribution of public documents. This Department has devoted considerable thought to devising means by which such waste may be checked, and it has developed that there is only one way by which this can be done, and that is by restricting gratuitous distribution, as is done by a number of foreign governments. The Department has made a few experiments in selling its publications, with uniformly satisfactory results. For a number of years the Coast and Geodetic Survey has sold its Tide Tables, Coast Pilots, and Coast Charts. Heads of Families, First Census of the United States, 1790, issued by the Bureau of the Census, and the World Trade Directory, issued by the Bureau of Manufactures (now a part of the Bureau of Foreign and Domestic Commerce), have also been sold in large quantities. During the past year the Department arranged with the Superintendent of Documents to furnish Sailing Dates, a monthly publication of the Bureau of Foreign and Domestic Commerce, to subscribers at the rate of $1 per year, and this periodical has been distributed on this basis since May, 1913. Certain monographs of the Bureau of Foreign and Domestic Commerce were ordered in limited quantities during the past fiscal year, with a view to their being exploited and sold by the Superintendent of Documents at approximately the cost of their printing, while very recently the Department has given its indorsement to a plan whereby the Superintendent of Documents is to maintain a subscription list for the Bulletin of the Bureau of Standards, as has been done since last May for the Monthly Bulletin of Sailing Dates. The List of Radio Stations of the United States, issued by the Bureau of Navigation, is another recent publication whose free distribution is limited to Government officials.

In all these cases the Department has had the hearty and helpful cooperation both of the bureaus affected and of the Superintendent of Documents, and the success which has attended experiments so far has convinced the Division that they should be extended gradually to many other publications now distributed gratuitously. It therefore recommends that this be done. This recommendation is based upon two very important considerations—first, the plan tends to check waste and extravagance in public printing by restricting excessive demands from sources which frequently can not be benefited by the publications; and second, and equally important, public appreciation of the work of the Department can not in any other way be so well gauged as by the willingness with which publications which it may issue are bought, as the Department thus has the public's estimate of the particular classes of publications which emanate from it, and consequently becomes familiar with the public's appreciation of lines of work which devolve upon it. Thus it is enabled to determine those lines to which it shall give greatest attention in developing its work.

Perhaps the Daily Consular and Trade Reports furnishes the best opportunity for the Department to apply the subscription idea in selling its publications. The limit of 20,000 copies placed by law on

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the edition of these reports was reached two years ago, and there are hundreds of requests for them which can not be complied with unless Congress permits the printing of a larger edition. This daily journal is undoubtedly being sent to persons who can not possibly have practical use for it comparable with its value to manufacturers and exporters, for whom primarily it is issued, but under the present plan of gratuitous distribution it is difficult to deny one citizen what is freely granted another. It is estimated that this publication could be supplied to subscribers for $3.50, or even $3, per year. If the recipient were required to pay such a nominal price for it the limit on the edition would in effect be removed, its distribution would be much more equitable than is possible under the present method, and the Department's printing and binding allotment would profit to the extent of about $40,000 per annum.

The Superintendent of Documents has ample authority to sell public documents at a price based upon the estimated cost of printing from stereotyped plates. There appears no reason why the Department should not take greater advantage of the authority thus granted to relieve its allotment for printing and binding of some of the heavy charges against it, while the sale plan would encourage a wider circulation of some publications than the limitation placed on editions by law now makes practicable.

The Division recommends therefore that the selling of the publications of the Department be extended and that it be permitted to work in conjunction with the Office of the Superintendent of Documents to that end.

ESTIMATES.

The following estimates for the personnel of the Division of Publications, for printing and binding for the Department of Commerce, and for contingent expenses of the Division of Publications for the fiscal year 1915 are submitted, with the request that the same be included in the Department's estimates to Congress.

PERSONNEL, DIVISION OF PUBLICATIONS.

Chief, Division of Publications	$2,500
Assistant Chief, Division of Publications (submitted)	2,100
2 clerks of class 4	3,600
2 clerks of class 3	3,200
2 clerks of class 2	2,800
2 clerks of class 1	2,400
5 clerks, at $1,000 each	5,000
2 clerks, at $900 each	1,800
2 assistant messengers, at $720 each	1,440
2 laborers, at $660 each	1,320
2 laborers, at $480 each	960
1 messenger boy, at $480	480
Total	27,600

The estimates for the personnel provide for an Assistant Chief of the Division of Publications at an annual salary of $2,100. A similar request was submitted by this Division in its estimates for each of the fiscal years 1913 and 1914, and the item was approved by the Department and submitted to Congress last year, but was not included in the appropriations.

The salary at present received by the clerk who performs the duties of assistant chief is not in keeping with the responsible character of

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his work or the dignity of the position, and other officials with the educational qualifications and the technical experience required of him are probably without exception better rewarded. Aside from this, the special technical training of this particular clerk and his devotion to duty, aptitude, and wide experience in the service make him especially valuable to this Department and merit the increase in salary which is proposed. Further, if the new position were given to the Division, as recommended, it would be possible to promote several deserving employees who have rendered to the Department long, faithful, and exceedingly valuable services, and the Division would be provided with one additional clerk. Thus a considerable advance step would be taken toward enabling the Division to give the publications of the Department the thorough editing and careful revising which their importance justifies and which heretofore has sometimes been impossible on account of the lack of a sufficient editorial force. This would result in true economy, as a saving in printing costs many times as great as the cost of the new position will be possible if the proper amount of attention can be given to the editing of manuscripts before they are sent to the Government Printing Office, to say nothing of the higher standard in publication work to be attained, which alone would warrant the additional expenditure.

PRINTING AND BINDING, DEPARTMENT OF COMMERCE.

For the Department of Commerce, including the Coast and Geodetic Survey and the Bureau of the Census, $500,000: *Provided*, That no part of this allotment shall be expended for printing and binding reports of the Thirteenth Census.

By direction of the Secretary the head of each bureau and office in the Department submitted an estimate of its needs for printing and binding for the fiscal year ending June 30, 1915. The total of these estimates was $543,196; but they were carefully revised by the Division, and it is believed that it will be possible to meet all anticipated requirements with $500,000, which is a reduction of $43,196 in the estimates submitted by the bureaus. The full amount asked for should be provided, however, as the Division has already curtailed the estimate to the point of possible embarrassment.

The allotment to the Department for printing and binding for the fiscal year 1914 is $525,000, of which $84,000 was on June 30, 1913, authorized to be transferred to the Department of Labor, leaving available for the Department of Commerce the sum of $441,000. Thus, for the fiscal year 1915, an increase of $59,000 is desired. This increase it is proposed to distribute among the offices and bureaus of the Department as shown in the following statement of differences between suballotments for 1914 and revised estimates for 1915:

Office of the Secretary	$1,000
Bureau of Corporations	1,500
Bureau of Foreign and Domestic Commerce	35,000
Bureau of Lighthouses	3,000
Office of the Supervising Inspector General, Steamboat-Inspection Service	1,000
Bureau of Fisheries	1,000
Bureau of Navigation	1,500
Bureau of Standards	2,000
Bureau of the Census	10,500
Division of Publications (for the Lighthouse, Steamboat Inspection, Shipping, Radio, and Customs Services)	2,500
Total	59,000

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The Disbursing Office, the Appointment Division, the Division of Supplies, and the Coast and Geodetic Survey, each of which has a suballotment, do not appear in the statement because increases for those offices are not asked for. For the other units of the Department increases range from $1,000 for each of several of the offices and bureaus to $35,000 for the Bureau of Foreign and Domestic Commerce. Large increases are requested, however, for only the Bureau of the Census and the Bureau of Foreign and Domestic Commerce.

Each of the offices sharing in the allotment for printing and binding was requested to give an estimate as to the class, size, and edition of each publication which it expected to submit for printing, the number of volumes to be bound for library and office use, and the probable percentage of increase or decrease as compared with 1913 in miscellaneous job printing. This information was obtained in most cases, and the increases submitted are based on the probable cost of the work which the bureaus and offices will require. The following is submitted, however, in explanation of the increases:

Bureau of Foreign and Domestic Commerce.—The allotment to the Bureau of Foreign and Domestic Commerce for 1914 is $7,818.07 below the actual expenditures of that Bureau for the fiscal year 1913 (necessitated by the size of the allotment to the Department, which was considerably below the estimates), in spite of the fact that the facilities of the Bureau are being utilized more and more each year by both Congress and the public. As a matter of fact it has not been possible in any recent year to allot to this Bureau all the money it has needed for printing and binding. The regular publications of the Bureau required to be printed are numerous and expensive, and include the Daily Consular and Trade Reports, and indexes thereto, which cost about $60,000 per annum; the Annual Report on Commerce and Navigation, and separates therefrom, which cost about $24,000 per annum; the Statistical Abstract of the United States, which costs about $5,300 each year; the Monthly Summary of Commerce and Finance, and separates therefrom, which cost about $22,700 per annum; Imported Merchandise Entered for Consumption and Duties Collected Thereon (issued quarterly), which costs about $3,800 per annum; and a variety of miscellaneous statistical statements. There are also the Annual Report of the Chief of the Bureau, tariff publications, special consular reports, reports of commercial agents, etc. These are all of growing interest and importance to the manufacturers, importers, and exporters of the country, and those interests will naturally suffer to the extent that the Bureau is deprived of the funds necessary to print and disseminate the valuable information which it collects. Especially is this true as concerns reports of commercial agents of the Department. For investigations by these agents Congress appropriates $60,000 annually.

Probably the most important need for an increase in the allotment to this Bureau has to do, however, with the duties transferred to it from the Bureau of Labor (now Bureau of Labor Statistics) by the act of August 23, 1912 (37 Stat., 407). These duties consist of ascertaining "at as early a date as possible, and whenever industrial changes shall make it essential, the cost of producing articles at the time dutiable in the United States, in leading countries where such articles are produced, by fully specified units of production, and under a classification showing the different elements of cost, or approximate cost, of such articles of production, including the

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wages paid in such industries per day, week, month, or year, or by the piece; and hours employed per day; and the profits of manufacturers and producers of such articles; and the comparative cost of living, and the kind of living; what articles are controlled by trusts or other combinations of capital, business operations, or labor, and what effect said trusts, or other combinations of capital, business operations, or labor have on production and prices."

Owing to the insufficiency of appropriations the Bureau of Labor had not, for about twenty years, made any investigations along the lines laid down in the foregoing provision of law, but the present Congress has already included in the deficiency bill an item of $50,000 for such purpose for the balance of the fiscal year 1914, and it is not unlikely that $100,000 will be provided for the fiscal year 1915. The printing of the results of these investigations is a matter of very great importance, and a generous allowance should be made therefor. Especially is this true at the present time, when a new tariff law is about to go into effect, which will render the information extremely timely as an aid to Congress in its consideration of proposed amendments to that law.

A further fact to be taken into consideration in connection with estimates for printing and binding for the Bureau of Foreign and Domestic Commerce is that in response to demands from the commercial public it is necessary from time to time to increase very largely the classifications of articles on which statistics of commerce are based. The result is to increase proportionately the size of its statistical publications. The increase in these classifications in publications to be issued in 1914 as compared with those issued in 1913 is about 20 per cent.

Bureau of the Census.—Since 1909 the cost of printing and binding for the Bureau of the Census has been charged against appropriations for the Thirteenth Decennial Census. This year (1914) the Bureau returns to its intercensal status, and an allotment of $139,500 has been made to it, against an appropriation during the corresponding year ten years ago (1904) of $250,000, of which $155,421.53 was spent. The estimate of the Bureau for 1914 was $157,715. Its allotment for 1914 is therefore $18,215 below its estimate and $15,921.53 below its actual expenditures ten years ago, despite the fact that in the meantime additional responsibilities, requiring a greater volume of printing, have been placed on the Bureau.

For 1915 the Bureau estimates its needs at $176,958, against an appropriation for the corresponding year ten years ago of $170,000, of which $150,178.18 was actually spent. The estimate submitted by the Division ($150,000) is therefore $26,958 below the estimate of the Bureau and $178.18 less than the actual expenditures ten years ago.

The Bureau of the Census submitted with its estimate a detailed statement concerning the publications which it proposes to issue during the fiscal year 1915. In view of the possibility, suggested by the Bureau, that several of these publications may either be printed during the present fiscal year or possibly not at all, the Division thought it would be justified in reducing the estimate as indicated. The estimate of the Division is therefore much below the possible needs of the Bureau. Should all the publications scheduled by the Bureau be submitted for printing, the full amount of the Bureau estimate

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would be required. Consideration should also be given to the possibility that the preparation of other reports may also be completed and that Congress may in the meantime require the compilation of material not already provided for by law.

In this connection it may be stated that heretofore appropriations for collecting and publishing statistics of cotton and tobacco have been available for printing those statistics. It is not believed to be good administration to pay for printing and binding from such miscellaneous appropriations. It is therefore proposed hereafter to pay for this work out of the regular printing allotment, in the event that the increase desired by the Division is provided. This will add about $7,000 to the cost of the printing and binding chargeable against the allotment to the Bureau.

Bureau of Lighthouses.—The allotment to the Bureau of Lighthouses for 1914 is $22,000, while for the fiscal year 1915 the Bureau estimates its needs at $32,500. This estimate is based on the desire of the Bureau to issue one edition each year of its several buoy and light lists. It would undoubtedly be in the interest of the service and decidedly helpful to navigation to revise and publish all of these lists each year, and if this were done the entire estimate would be required. The Division, however, doubts that it will be possible for the Bureau to do this, and has consequently reduced the estimate to $25,000, which sum will enable the Bureau to make some progress toward the desired condition.

The cost of printing these publications, as compared with the cost of preparation and compilation, is a small part of their total cost, and it is not believed that Congress in its wisdom will be likely to restrict their issue by curtailing the printing allotment, especially as their usefulness and real value is so generally recognized.

Bureau of Navigation.—The acts of June 24, 1910, July 23, 1912, and August 13, 1912, governing radio communication, and the act of June 9, 1910, relating to the operation of motor boats, have very greatly enlarged the scope of the work of the Bureau of Navigation, and its printing requirements have been correspondingly affected. These acts require the printing and distribution in large numbers of several pamphlets, one of them being a list of radio stations in the United States (see section 1, act of August 13, 1912). The Bureau submitted an estimate for $14,000 for 1915. The Division doubts that this sum will be sufficient to meet the absolute needs of the Bureau, though it has decided to permit the estimate to stand. The average expenditures of the Bureau of Navigation for the five years 1908–1912 were $11,600.06, and for 1913 the expenditures were $10,413.79. To the expenditures for 1913 should be added $1,716.58 expended from the appropriation for the enforcement of the wireless-communication laws, making a total of $12,130.37 for that year. The cost of printing made necessary by the radio laws will increase during future years, and the $12,500 allotted to the Bureau for 1914 will barely be sufficient for that year. In 1915 the Bureau will print its quadrennial issue of the Navigation Laws, a volume which will consist of about 550 pages and cost about $2,400. Thus for that year $15,000 would be no more than the Bureau will actually need.

Bureau of Standards.—The expenditures of the Bureau of Standards for printing and binding for the fiscal years 1908–1912 averaged $13,085.39. In the fiscal year 1913 these expenditures were $18,278.49,

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while the allotment to the Bureau for 1914 is $23,000. These figures show a rapid increase in the cost of work for this Bureau, which has progressed as facilities for research and testing work by the Bureau have been provided by Congress. The estimate submitted by the Bureau for 1915 is $30,000, and this it considers moderate. The Bureau asserts, and the Division believes, that this sum, if provided, would be spent to very great advantage, the argument being advanced that publications recording scientific achievements should be given a distribution commensurate with the cost and effort involved in their preparation. The Division recognizes the value of the publications issued by the Bureau, and that handicaps have sometimes been imposed by its small printing allotment. It realizes also that the editions of these publications are smaller than the demands of the public and Government officials really justify, and consequently has included in its estimate for 1915 an increase of $2,000 over the allotment for 1914. The Division's estimate is, however, $5,000 below that of the Bureau.

Bureau of Corporations.—The Bureau of Corporations estimates that it will submit for printing during the fiscal year 1915 reports of investigations which will aggregate about 3,200 pages. In addition it asks for $1,000 for printing the annual report of the Commissioner and miscellaneous job work. The total of its estimate is $14,000. If all the reports which the Bureau has in preparation and in contemplation for issue in 1915 are completed, $14,000 is a conservative estimate of their cost. In fact, $18,000 would probably be required, as publications of the Bureau have heretofore cost about $5.50 per page. The expenditures of the Bureau for 1913 were $11,524.50, despite the fact that the number and size of its original reports were far below those which it expects to issue in 1915. The Division, in reducing the estimate of the Bureau to $12,500, has been guided more, therefore, by the expenditures of the Bureau in the past than by the estimate as submitted by it. It has adopted this course because of knowledge of the difficulty which the Bureau has in making an accurate estimate at the beginning of one fiscal year of the reports which it may issue in a succeeding year, and because it is the policy of the Division in submitting estimates to confine itself to actual rather than possible or even probable needs.

It should be considered, however, that this Bureau may be called upon by Congress or the President to make special investigations, the reports of which would require additional funds for printing.

Bureau of Fisheries.—For the fiscal years 1908–1912 the expenditures of the Bureau of Fisheries for printing and binding averaged $11,479.84, and for 1913 they were $12,897.91. The allotment to the Bureau for 1914 is but $12,000, or $897.91 less than its actual expenditures in 1913. Its estimate for 1915 is $15,500, but the Division has included in its estimate an item of only $13,000. The Division's estimate is only $102.09 more than the actual expenditures of the Bureau in 1913, though it is $1,000 in excess of the allotment for 1914.

The Bureau has complained frequently that it is hampered by a small printing and binding allotment, and it must be admitted that there is merit in its contention. The biological and natural-history investigations conducted by the Bureau have a wide latitude, and the public demand for reports concerning them is constantly assuming wider proportions. These reports are particularly valuable now that

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the conservation of fishery resources has become of such general interest. In addition, the statistical and administrative reports which the Bureau is required to issue take up a considerable part of its allotment. The life history and habits of fishes, methods of propagation, and the protection of the supply of food fishes are studies which form the basis of many reports which the Bureau desires to issue in increasing numbers, and public interest in these subjects would suggest that the Bureau be allowed the full amount of its estimate ($15,500), but in order to keep expenditures down to the lowest possible sum the Division has felt compelled to reduce this estimate to $13,000.

Office of the Supervising Inspector General, Steamboat-Inspection Service.—This Office expended for printing and binding during the fiscal years 1908–1912 an average annually of $4,537.82, and in 1913 $2,456.71, the average from 1908 to 1913 being $4,190.97. The estimate of the Bureau for 1915 is $5,000, which has been reduced by the Division to $4,000. Owing to the size of the Department's allotment for 1914 only $3,000 was suballotted to this Office. The reduced expenditure during the fiscal year 1913 was due largely to the omission of certain statistical tables from the Annual Report of the Supervising Inspector General.

The estimate of $5,000 by the Bureau is based upon its desire to insert in its annual List of Officers of Merchant, Steam, Motor, and Sail Vessels Licensed additional information, which will show the place and date of issue of the previous license issued to each officer, for the purpose of tracing in previous volumes the license record of any licensee. The result will be practically to double the size and cost of the publication and will require about $1,700 more money than has heretofore been allotted to the Bureau. Even the $4,000 estimated by the Division will not be sufficient to include this extra cost, and if it should be decided to print the list in the form proposed it will be necessary to curtail expenditures in some other way. Even though the list be not printed in the form proposed, it will be necessary, therefore, that the sum of $4,000 be allotted to the Bureau if it is not to be embarrassed by insufficient funds for printing and binding.

Office of the Secretary (Secretary, Assistant Secretary, Solicitor, Chief Clerk, General Supply Committee, and Division of Publications).—The expenditures of the Office of the Secretary in 1913 were $19,408.28, but the size of the allotment to the Department for 1914 permitted only $13,925 to be suballotted to this Office. This suballotment is $5,483.28 below the actual expenditures of the Office in 1913. For 1915 the Division desires $14,925, which is $1,000 more than the small suballotment for 1914, but $4,483.28 below 1913 expenditures. That the Department should have this amount is demonstrated by the figures given. It is an accepted fact that the growth of the units of the Department results in a corresponding increase in expenditures of the Office of the Secretary for printing and binding, as this Office furnishes the miscellaneous printed supplies used in common by all the offices and bureaus of the Department. Its suballotment must be utilized also for the annual reports of the Department (a consolidation of the report of the Secretary and reports of the heads of all bureaus and divisions), the Annual

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Report of the Secretary, the Annual Report of the Chief of the Division of Publications, Department circulars and decisions, and miscellaneous publications of several units of the Office of the Secretary. Another drain on this suballotment has been caused by the printing account of the General Supply Committee, created by section 4 of the act of June 17, 1910. In 1912 the Department was called on to furnish $1,360.03 for the committee, and in 1913 the bill was $2,000. There is no way to determine what the Department will be called on to contribute in 1915.

It had been the purpose of the Division to submit an even larger estimate for the Office of the Secretary, but it did not do so because it desired to confine the total estimate for the Department to $500,000.

Division of Publications (for outside services).—A total of $35,500, or an increase of $2,500, is estimated by the Division of Publications for the Lighthouse, Steamboat-Inspection, Shipping, Radio, and Customs Services. This fund is used for purchasing blank books and forms for the services named. Congress is aware that these supplies are used by the services in keeping records and making reports required by law and Department regulations promulgated thereunder. The books and forms have been systematized and standardized and each service is required to use as far as possible the general forms provided for that service. To facilitate the filling of requisitions and in the interest of economy, they are printed in large quantities, kept in stock, and issued as called for. Legislation from time to time, such as recent acts concerning the operation of motor boats and regulating wireless apparatus and communication, add to the duties of the services and necessitate not only many new forms but the use of much larger quantities of old forms, and as a consequence the expense of printing them is added to. The expenditures for this class of printing and binding in the fiscal years 1908–1912 averaged annually $32,331.60. In 1913 they amounted to but $23,550.99, due to the fact that the expenditures that year of several of the bureaus exceeded their suballotments, and it became necessary to use for them suballotments made to the Division of Publications and consequently to allow the usual stock of blank books and forms to become depleted. The Division's estimate for 1915 is $3,138.40 more than the actual average expenditures during the fiscal years 1908–1912, but it should be borne in mind that these expenditures did not include forms for the Radio Service, which has just been organized. The Division is convinced that it can not well get along with less than the amount estimated for ($35,500).

The following statement shows the average expenditures in 1908–1912, expenditures in 1913, allotments for 1914, and estimates (both of the bureaus and the Division) for 1915 for printing and binding for the Department of Commerce, by bureaus, offices, and services.

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Bureau, office, or service.	Average expenditures, 1908–1912.	Expenditures, 1913.	Allotments, 1914.	Estimates, 1915.	
				Bureaus.	Division.
Office of the Secretary (Secretary, Assistant Secretary, Solicitor, Chief Clerk, General Supply Committee, and Division of Publications)	$17,234.40	$19,408.28	$13,925.00	$14,925.00	$14,925.00
Disbursing Clerk		1,133.42	900.00	900.00	900.00
Appointment Division		396.05	400.00	450.00	400.00
Division of Supplies		363.75	400.00	400.00	400.00
Bureau of Corporations	10,718.23	11,524.50	11,000.00	14,000.00	12,500.00
Bureau of Foreign and Domestic Commerce	139,704.07	142,818.07	135,000.00	170,000.00	170,000.00
Bureau of Lighthouses	20,385.07	20,219.62	22,000.00	32,500.00	25,000.00
Coast and Geodetic Survey	29,227.10	26,526.52	28,000.00	26,688.00	28,000.00
Office, Supervising Inspector General, Steamboat-Inspection Service	4,537.82	2,456.71	3,000.00	5,000.00	4,000.00
Bureau of Fisheries	11,479.84	12,897.91	12,000.00	15,500.00	13,000.00
Bureau of Navigation	11,600.06	10,413.79	12,500.00	14,000.00	14,000.00
Bureau of Standards	13,085.39	18,278.49	23,000.00	30,000.00	25,000.00
Bureau of the Census	(a)	[b] 33,258.76	139,500.00	176,958.00	150,000.00
Division of Publications for—					
Lighthouse Service	9,770.82	6,716.44	9,300.00	10,000.00	10,000.00
Steamboat-Inspection Service	9,938.23	6,767.34	9,300.00	10,000.00	10,000.00
Shipping and Radio Services	2,706.23	3,135.02	5,100.00	5,500.00	5,500.00
Customs Service	9,916.32	6,932.19	9,300.00	10,000.00	10,000.00
Reserve			6,375.00	6,375.00	6,375.00
Total	[c] 290,232.82	[b] 323,246.86	441,000.00	543,196.00	500,000.00
Bureaus, offices, and services transferred to Department of Labor	74,467.97	76,750.00	84,000.00	.....	.....
Grand total	364,700.79	399,996.86	525,000.00	.....	.....

[a] Work for Bureau of the Census paid for from separate allotments.
[b] Expenditures for Bureau of the Census paid for largely from Thirteenth Census appropriation. Permanent Census work only paid for from the allotment to the Department.
[c] Does not include expenditures for Bureau of the Census.

It will be noted from the foregoing table that in only one case, that of the Coast and Geodetic Survey, did the Division increase an estimate submitted by a bureau. A study of the estimate of the Survey convinced the Division that the amount named by it would be insufficient to pay for the publications which it proposes to issue in 1915. The estimate was therefore increased from $26,688 to $28,000, which is the sum suballotted to the Survey for the fiscal year 1914.

The column of the table headed "Expenditures, 1913," shows that the unexpended balance of the Department for the fiscal year 1913 was but $3.14. In addition, the Department of Commerce had at the Government Printing Office on July 1, 1913, unbilled and uncompleted work which it is estimated will cost $32,660.20. This is $4,624.33 in excess of the estimated cost of the unbilled and uncompleted work at that office at the beginning of the preceding fiscal year (the figures of the preceding year including the work of the bureaus, offices, and services since transferred to the Department of Labor). Thus, it is apparent that the allotment to the Department for 1913 was below its actual needs, and in view of the fact that the amount of printing for the Bureau of the Census will be very large in the fiscal year 1914 it is believed that it will require the exercise of every possible economy to hold the expenditures of the Department for that year down to its allotment. These conditions have actuated the Division in requesting an increase in the allotment for 1915. A study of the table will show, however, that the increases are desired not so much for the Department as a whole as for the work required for the Bureau of Foreign and Domestic Commerce and the Bureau of the Census. The increases requested for these two bureaus total $45,500, while those for all the other bureaus and offices combined total but $13,500.

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A comparison of the estimates submitted by the Department for 1915 with those submitted for 1914 will show decreases for the Office of the Secretary ($75), Appointment Division ($50), Division of Supplies ($100), Coast and Geodetic Survey ($2,000), and the Division of Publications for the outside services ($225). For the Disbursing Clerk, Bureau of Lighthouses, Office of the Supervising Inspector General, Bureau of Standards, and the Bureau of the Census the estimates are the same as those for last year. Thus the increases are confined to the Bureau of Corporations ($500), Bureau of Foreign and Domestic Commerce ($25,000), Bureau of Fisheries ($1,000), and Bureau of Navigation ($500). The total increase in the estimates as compared with those submitted last year is $24,550.

CONTINGENT EXPENSES, DIVISION OF PUBLICATIONS.

It is estimated that the requirements for the contingent expenses of the Division of Publications for the fiscal year 1915, except light, heat, power, and telephones, will be $7,500. This is the amount of the allotment to the Division for the current fiscal year.

ADVERTISING.

During the year 192 authorizations for publishing advertisements in newspapers and periodicals throughout the country were issued, and the vouchers in payment for this advertising, representing expenditures of more than $1,000, were passed upon by the Division.

DIGEST OF THE CONGRESSIONAL RECORD, ETC.

The Division prepared for each day Congress was in session a digest of the Congressional Record, in quadruplicate, for the use of the Secretary, the Assistant Secretary, the Chief Clerk, and the Director of the Census. Also congressional bills, reports, documents, and pamphlet laws were scrutinized in this Division and judicious distribution of the Department's allotment was made to the chief officers and the heads of the various bureaus of such of those as pertained to the administration of the Department.

CONCLUSION.

In conclusion it is desired to acknowledge the faithfulness of the employees of the Division and to express the hope that the estimates submitted by the Division may be approved by the Department and by Congress, to the end that several of these employees may be promoted to higher grades in recognition of their worth and splendid devotion to duty. The Division of Publications is no exception to the rule that the head of an office must depend for results on the rank and file of its personnel—the men behind the guns, if you please—and the willingness and efficiency shown by the employees of the Division merit more substantial recognition than mere words of praise.

Respectfully,

DAN C. VAUGHAN,
Chief, Division of Publications.

To Hon. WILLIAM C. REDFIELD,
Secretary of Commerce.

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